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TRANS WORLD TIDAL GRAVITY PROFILE(U) INTERNATIONAL
CENTRE FOR EARTH TIDES BRUSSELS (BELGIUM) P MELCHIOR
31 DEC 84 AFGL-TR-85-0202 AFOSR-82-0097

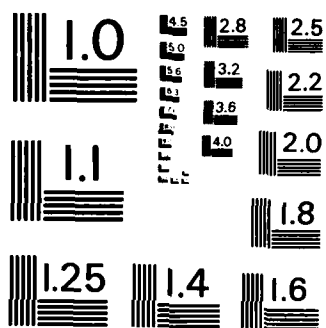
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TRANS WORLD TIDAL GRAVITY PROFILE

Paul Melchior

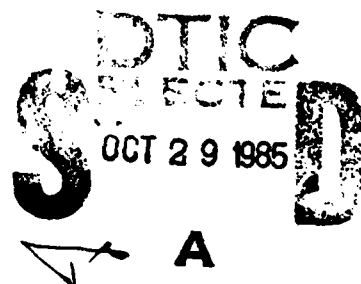
International Center for Earth Tides
Royal Observatory of Belgium
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31 December 1984

Final Report
1 January 1984 - 31 December 1984

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AIR FORCE SYSTEMS COMMAND
UNITED STATES AIR FORCE
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20. Abstract The study analyzes 115 stations in the World Data Bank for Tidal Gravity. Under this study, 76 of these stations have been established in the equatorial and tropical regions as well as the Southern Hemisphere. This broad coverage has allowed, for the first time, for experimental determination of the Love numbers foreseen by Love (1911) and confirmed by Wahr (1981). This effect results from the flattening of the Earth and from the Coriolis force.		

International Center for Earth Tides
Centre international des Marées terrestres
(ICET)

(Federation of Astronomical and Geophysical Service, FAGS)

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Trans World Tidal Gravity Profile

Grant AFOSR 82-0097

Final Scientific Report

Period 1984 January 01 - 1984 December 31

1. - A most impressive result of this programme is that, in the World Data Bank for Tidal Gravity measurements recently established by Ducarme (1983), 115 stations amongst a world total of 238 have been installed and maintained and their registrations analysed in the frame of this "Trans World Tidal Gravity Profile" (83 according to the Table 1, plus a number of stations in Europe). Moreover, all the equatorial, tropical and southern hemisphere stations (except only 3 over a total of 76) are a result of this programme (see Figure 1, Table 1).
2. - This broad coverage over Europe, Asia, East and West Africa, Australia, South Pacific and South America (just started) has allowed, for the first time, to experimentally determine the latitude dependence of the Love numbers combination $\delta (= 1 + h - \frac{3}{2} k)$ foreseen by Love (1911) and firmly established by Wahr (1981). This effect results from the flattening of the Earth and from the Coriolis force. See Table 2.
3. - A careful analysis of the data obtained in 1982-83 by us in China, Korea and Japan show that the Schwiderski map for the wave M_2 is to be slightly corrected near Taiwan and complemented by adding small polygons corresponding to the gulfs of Liantung and Petchili and the Korea Bay, a rather large area with strong but complicate tides (3 amphidromic points) which is not included in the Schwiderski model. (Figure 2).

We have completed the computations and obtained a general decrease of the amplitudes of the final residues \bar{X} (observed minus computed, see Figure 3), even in stations rather remote from the sea, of about 50 % that is less than one microgal everywhere except at Shanghai. (Table 3).

This shows that similar improvements should be made in a number of areas.

4. - We have shown that our series of measurements are so precise that a comparison can also be made at the level of 0.3 microgal ($3 \cdot 10^{-10}$ of g) with the Schwiderski cotidal maps of the small waves Q_1 and K_2 . This had, of course, never been done before.

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5. - We have always strongly insisted upon the extreme importance of the instrumental phase lags determinations because most of the people, previously and even now, did not took care of it. However this correction is, very often, *of the same size* as the effect to be measured and it is not astonishing if it is impossible to reconcile such uncorrected measurements with the computations made for an earth model with oceans.

In this respect, an interesting experience was made in 1983 by us, in Japan, where a net of four tidal gravity stations gave experimental results in strong disagreement with the effects computed on the basis of Schwiderski maps. We have installed one of our meters, correctly calibrated, at Tokyo (one of the stations in this net) and, by direct comparison with the japanese instrument obtained its instrumental constants. After the resulting correction the four stations results came in much better agreement with the computations (see Table 4).

These two results give us confidence in the correction of our operations - but this does not mean that controls are not necessary in the few stations where anomalies have been detected.

6. - The results reported on Table 2 show that, for the coefficients of the latitude terms, there is a fair agreement with the only theoretical model which includes earth's flattening and Coriolis force, i.e. the Wahr model.

However there is a discrepancy as large as 1 % on all the independent terms.

We decided to investigate that problem from both sides : theoretical and experimental.

The theoretical developments are presently under examination by one of my assistants Mrs Dehant who visited J. Wahr in 1984. Her work is progressing quite well but it is a long and hard task and we do not know the results yet.

The experimental research is developped along three different lines :

- (a) - The transformation of all our LaCoste-Romberg gravimeters into zero method instruments by electrostatic feedback. This was made according to the Harrison-Sato procedure with some slight improvement introduced by Van Ruymbeke which makes the system valid whatever be the transducer plates positions. The analysis of several series in Bruxelles showed that this modification was fully successful. It has reconfirmed the validity of the rheological models previously used for the computations in the Trans World Profiles.
- (b) - The construction, by Van Ruymbeke, of a very stable platform moving vertically by 2.15 cm at variable speeds (minimum period 200 s). The gravimeter is then calibrated with respect to the inertial force (maximum is 4 mgal) while the vertical gradient is eliminated by using the different speeds. The first experiments let hope to reach a precision of 0.1 % on amplitudes comparable with the tidal amplitudes (200 μ gal).
- (c) - The establishment of a European tidal gravity calibration line including 3 stations (figure 4) :

Kevo, Finland, latitude 69°45'
Subarctic Research Station

Bruxelles, Belgium, latitude 50°48'
Royal Observatory

Madrid, Spain, latitude 40°38'
Universidade Complutense

(Bruxelles being included to compare with the GWR Superconducting gravimeter and because series of more than 30 different instruments have already been performed there).

Three LaCoste-Romberg / zero method (402, 487, 665) have already been installed for periods of six months at each station.

The first analysis of these series tend to confirm the previous experimental results which should indicate the need for a correction to the Wahr model.

(Note : a short summary published in EOS 65, page 859, ref. G32-09 by Gwinn, Herring and Shapiro reports that, according to 4 years VLBI data, a small correction is to be applied to the Wahr nutation series. Such a correction should be in agreement with our tidal gravity measurements).

7. - The preliminary analysis of the data obtained in 1984 at 8 stations in South America, 5 stations in West Africa and the 3 stations of the european calibration line are reported hereafter.

At the end of 1984, despite the termination of this USAF contract, I have decided to maintain all the instruments in operation at the sites where they are. I have good hope to obtain small grants in 1985 from different sources in Belgium, in South America and from Unesco to maintain the operation for one more year. My plan is to have stations in 1985 at Lima (Peru), La Paz (Bolivia), Manaus, Rio Branco, Salvador (Brazil), Yaoundé (Cameroon), Franceville (Gabon) and Brazzaville (Congo).

May I hope that USAF could reconsider the possibility of a grant in 1986 to complete the nets in South America, West and Central Africa ...



Date

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STATIONS OPERATING IN 1984

The listings of the analysis of the registrations are given in Appendix for each of these stations.

1. South America

Curitiba (Brazil)

This station, situated at the Universidade Federal do Parana, in the Instituto de Ciencias Geodésicas under Professor C. Gemaël, has been chosen as fundamental station for intercomparison of all the instruments involved in the completion of the brazilian tidal gravity network. It has been installed and revisited several times by Ducarme, Van Ruymbeke and Poitevin. In july 1984, M. Van Ruymbeke has transformed the three LaCoste Romberg instruments (n° 3, n° 8, n° 32 D) into zero method instruments. Series of measurements have been made before and after the transformations as shown on the following table :

Instrument	Number of hourly readings	Number of days	Efficiency coefficient
LCR 3 - original device -	1344	60	0.933
LCR 3Z - zero method -	1844	92	0.835
LCR 8 - original device -	1344	59	0.949
LCR 8Z - zero method -	1872	105	0.743
LCR 32 D - original device -	1920	85	0.941
LCR 32 DZ - zero method -	1920	92	0.870
GEOD 783 = paper recorder -	3792	174	0.908
GEOD 783 - cassette recorder -	2448	155	0.658

The many data obtained at Curitiba have been provisionally analysed and are still under consideration for definitive conclusions.

Viçosa (Brazil)

LCR 3

2736 readings within 166 days, efficiency : 0.687.

Maintenance is satisfactory but not excellent.

Santa Maria (Brazil) LCR 32 D

2832 readings obtained within 175 days, efficiency : 0.674.
Maintenance is satisfactory but not excellent.

Campo Grande (Brazil) LCR 8 + LCR 32

LCR 8 : 1824 readings obtained within 150 days, efficiency : 0.507.
We are not very happy with the results and, by the end of 1984, Poitevin has installed LCR 32 (zero method) at the same place for a new series of measurements which is now going on.

Goiania (Brazil) Grav. GEOD 783 established by Poitevin

3792 readings within 199 days, efficiency : 0.794.

Cuiaba (Brazil) Grav. GEOD 783 established by Poitevin in november 1984 operates with success. A first analysis has been made upon 48 days measurements.

Caico (Brazil) Grav. LCR 8Z/ zero method, established by Poitevin in december 1984. The first very preliminary results (23 days) show that it operates correctly.

Santa Cruz (Bolivia) Grav. GEOD 84 established by Van Ruymbeke. This instrument had to be installed to La Paz but the very low gravity could not be reached within the range of this instrument. Van Ruymbeke moved then to Santa Cruz where an important hospital is runned by belgian physicians who accepted to maintain the instrument. Due to some difficulties we have analysed, up to now, the 54 first days which are excellent. There was then a long interruption but we have now succeeded to obtain about 40 more days of registration. The maintenance is excellent, considering the special difficulties in that region.

2. West Africa

Lamto (Ivory Coast) Grav. GEOD 765 established by Van Ruymbeke.

3264 readings within 145 days, efficiency : 0.938.

The site was excellent and the staff also. Our station was under the responsibility of Mr Tounier, the founder of the LAMTO Observatory.

Niamey (Niger) Grav. LCR 336Z, zero method, established by Van Ruymbeke.

2208 readings within 133 days, efficiency : 0.692.

A station difficult to maintain as often in West Africa.

Arlit (Niger) Grav. LCR 336Z (zero method), established by Van Ruymbeke.

1920 readings within 138 days, efficiency : 0.580.

This was a very difficult station to install and to maintain because of several "obvious" reasons. It was maintained by catholic missionaries. The equipment had to be taken back by the Ambassador of Belgium himself ...

Ouagadougou (Burkina Faso/Upper Volta) Grav. GEOD 765 established by Van Ruymbeke.

2688 readings within 142 days, efficiency : 0.789.

A station difficult to maintain as often in West Africa.

Bangui (Centrafricaine) gravimeters GEOD 765 and LCR 336 Z (zero method) established by Ducarme by the end of 1984 to obtain a long series of simultaneous registration. We have much hope because the site is excellent.

3. European Calibration Line

Kevo (Finland) Simultaneous recording with two La Coste Romberg model G, zero method : 402, 665 (six months each).

Bruxelles (Belgium) GWR Superconducting gravimeter in continuous operation since.

Madrid (Spain) Simultaneous recording with two La Coste Romberg model G, zero method : 402, 487 (four months each).

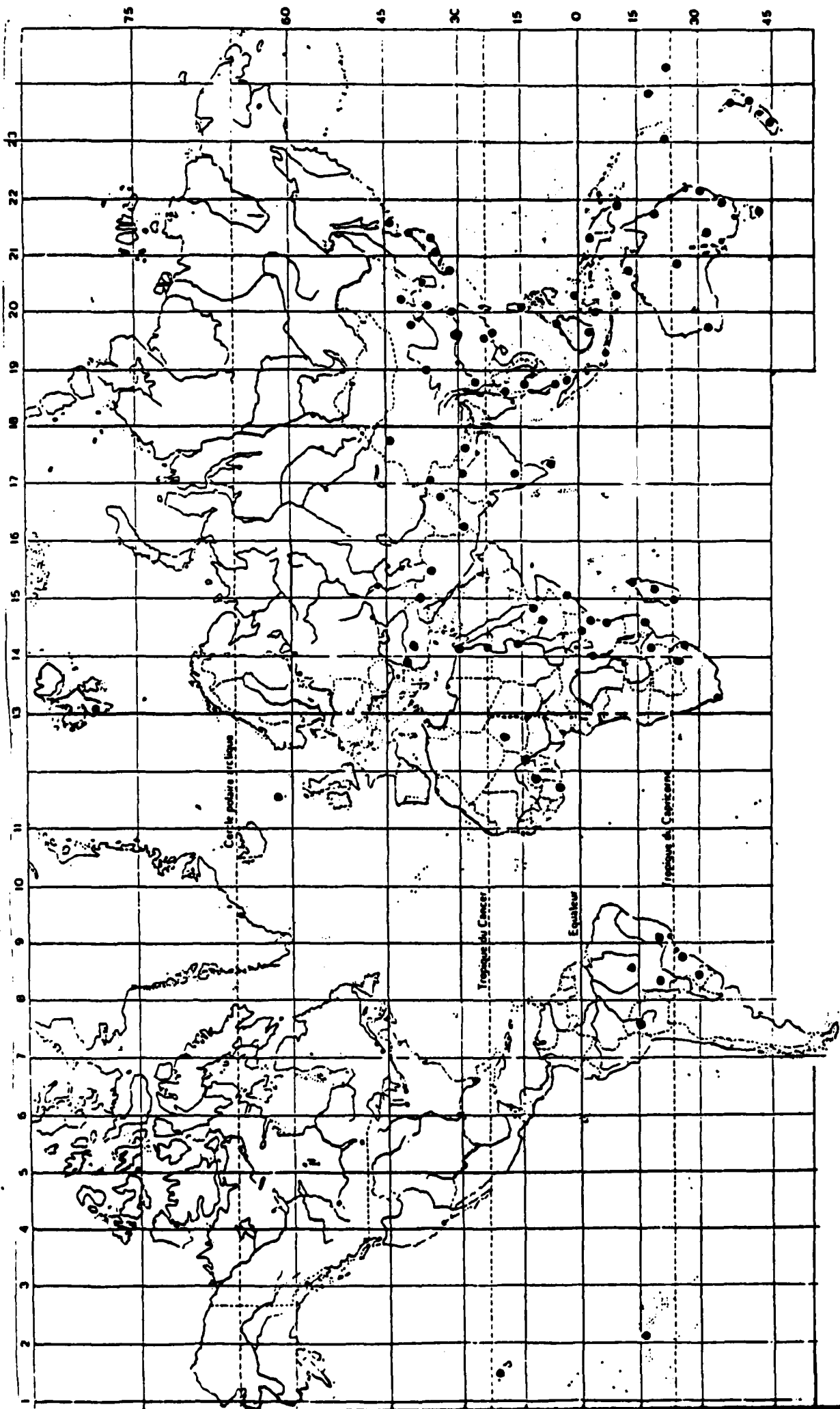


Figure 1 : Trans World Tidal Gravity Profile
ICET 1973 - 1984

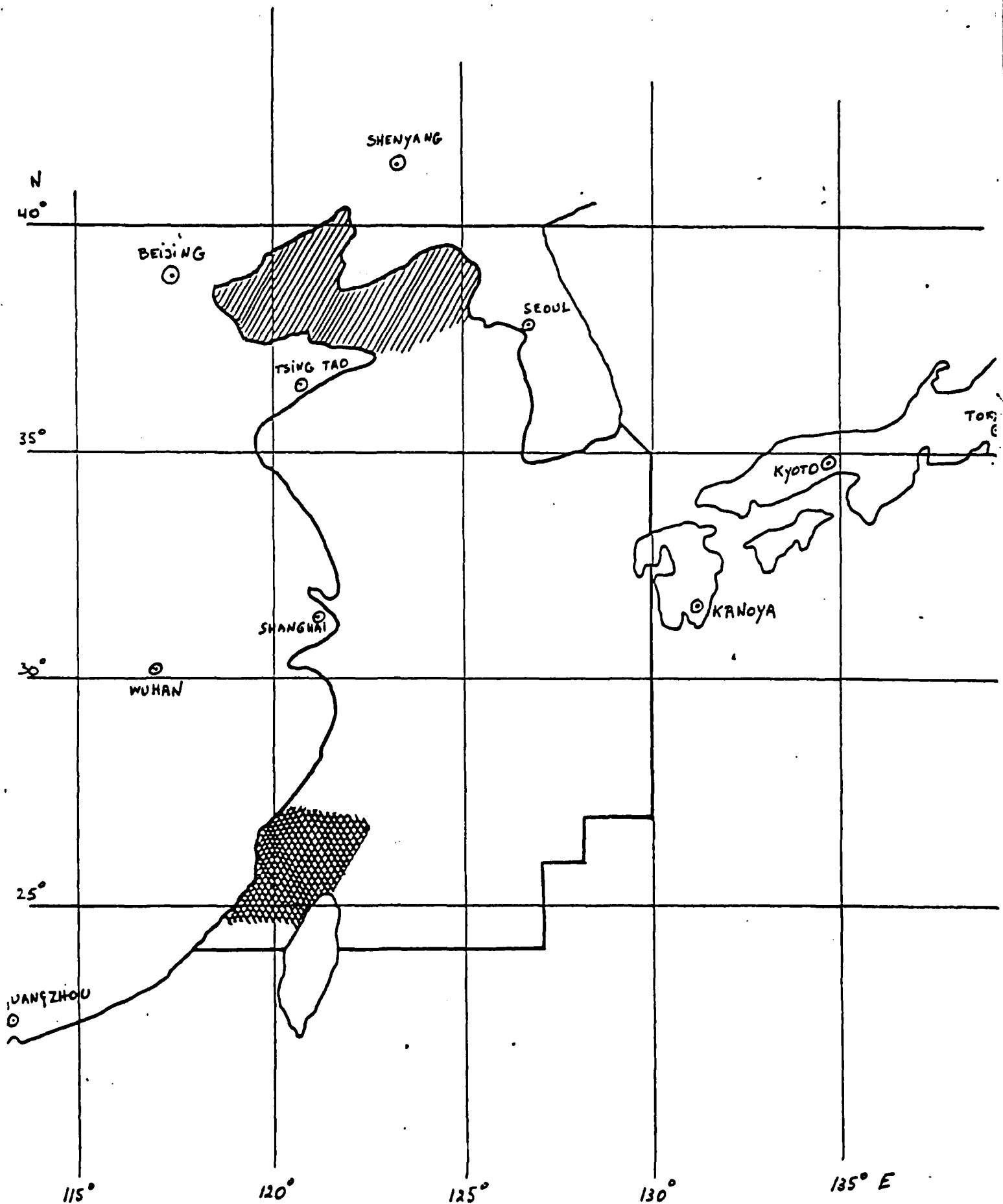


Figure 2 : Areas added or modified in the Schwiderski maps.

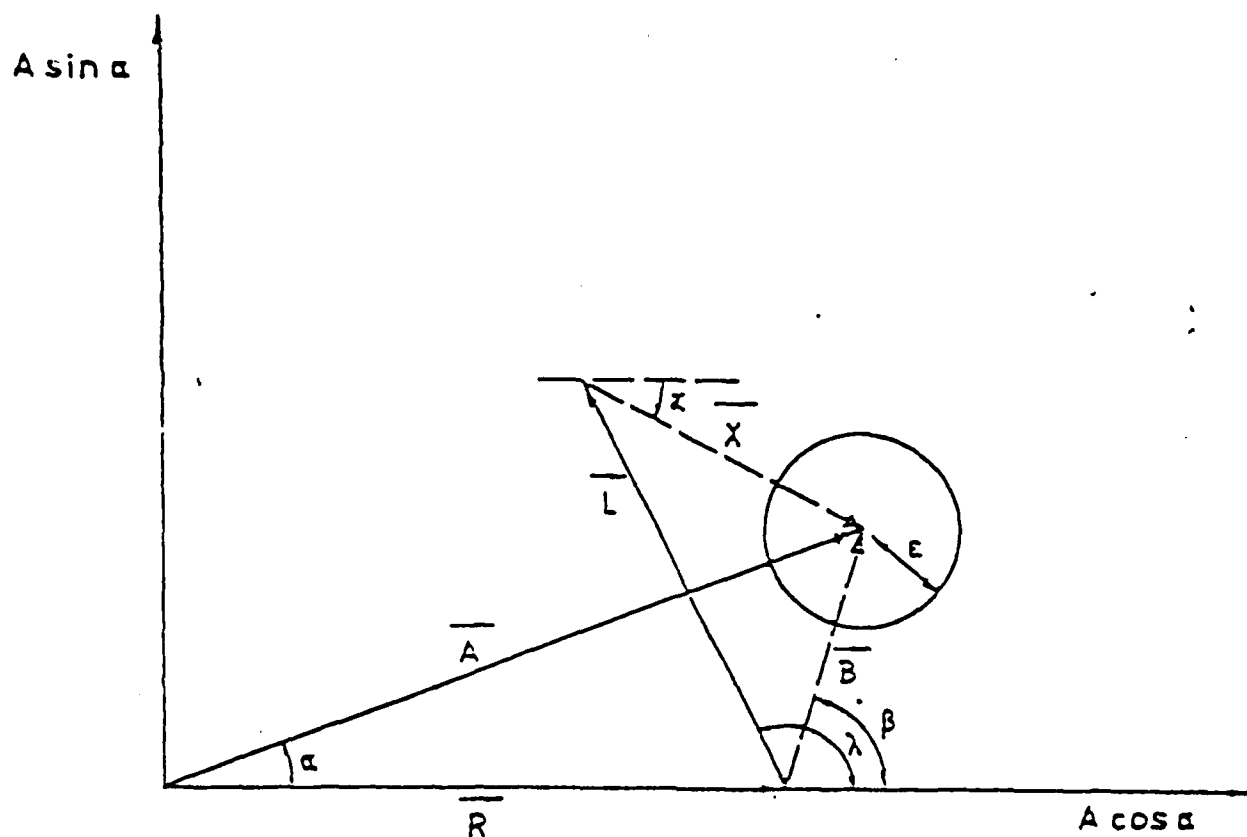


Figure 3

- \vec{A} observed vector (A : amplitude, α : phase)
 \vec{R} tidal vector for an elastic non-viscous earth with liquid core but oceanless (R : amplitude, zero phase)
 \vec{L} ocean attraction and loading vector (L : amplitude, λ : phase)
 $\vec{B} = \vec{A} - \vec{R}$ (B : amplitude, β : phase)
 $\vec{X} = \vec{B} - \vec{L}$ (X : amplitude, χ : phase)

For the semi-diurnal wave M_2 , the correct scale of this figure should be on the order of

$$R \sim A \sim 400 \text{ nms}^{-1} \text{ (Europe) to } 900 \text{ nms}^{-1} \text{ (Equatorial zone)}$$

$$\alpha \sim 0^\circ \text{ to } \pm 5^\circ$$

$$L \sim B \sim 20 \text{ to } 100 \text{ nms}^{-1}$$

$$\epsilon \sim 5 \text{ nms}^{-1} \text{ (Europe) to } 10 \text{ nms}^{-1} \text{ (Equatorial zone)}$$

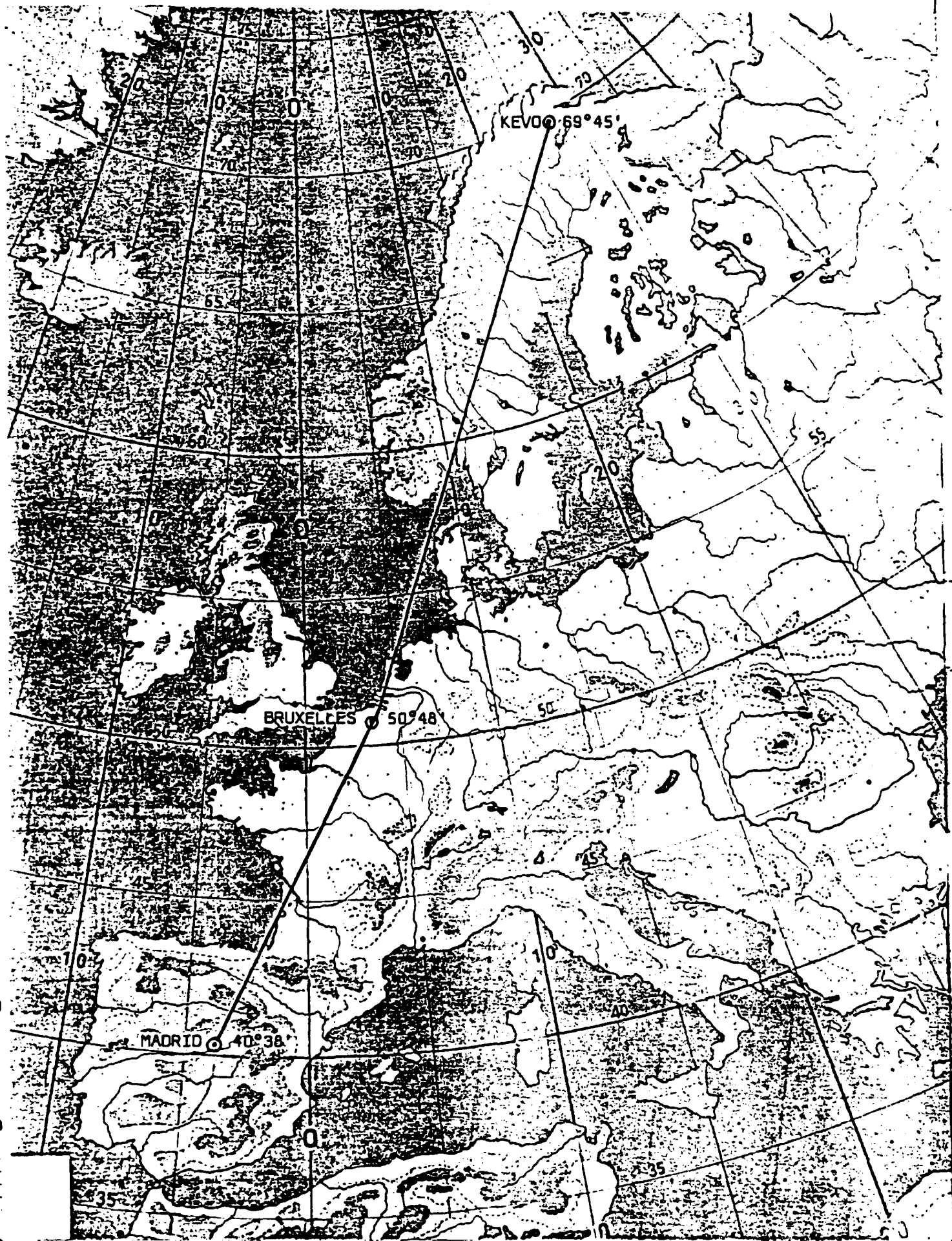


Figure 4.

TABLE 1 PROFIL MONDIAL DE MAREES TERRESTRES

1973 - 1984 : 83 stations (six months measurements).

SIA (32 stations)	SOUTH PACIFIC (20 stations)	EAST AFRICA (23 stations)	SOUTH AMERICA (8 stations)
Bulbul ra (*) } iz } Iran } awar } ta } re } rabad andu (2) mbu ng Mai (2) } kok } ng a Lumpur Kinabalu la g Tao yang ing hou (*) chi n (*) (4) ing on ghai Kong o mbetsu sawa o ya l	Banjar Baru Bandung Manado Makassar Jaya Pura Timor Port Moresby - Papua Darwin Perth Alice Springs (*) Broken Hill Canberra (*) (4) Charters Towers Hobart Hamilton Lauder Noumea Suva Apia Papeete - Indonesia - Australia - New Zealand - N. Caledonia - Fiji - Samoa - Tahiti	Helwan } Aswan } Khartoum Addis Ababa Mogadiscio Nairobi } Voi } Dar es Salaam - Tanzania Butare Harare Nampula } Maputo } Arta Antananarivo Tolagnaro Nossi Bé Johannesburg Stellenbosch - Egypt - Sudan - Ethiopia - Somalia - Kenya - Mozambique - Djibouti - Madagascar - South Africa	Curitiba (4) Santa Maria Viçosa Campo Grande Goiânia Cuiabá Caico Santa Cruz - Bolivia
- Turkey - Iran - Pakistan - India - Nepal - Sri Lanka - Thailand - Malaysia - Philippines - China - Japan - Korea			
		WEST AFRICA (4 stations)	
		Lamto Niamey } Arlit } Ouagadougou Bangui - Ivory Coast - Niger - Bourkina Fasso - Centrafica	

(*) stations with more than six months measurements.

(n) number of different instruments used.

Table 2

Diurnal waves

$$X_1 = Y_4^1 / Y_2^1 = \frac{\sqrt{6}}{4} (7 \sin^2 \phi - 3)$$

$$\begin{array}{ll} O_1 & W \quad \delta = 1.1520 - 0.0063 X_1 \\ & MB \quad \delta = 1.1618 - 0.0028 X_1 \\ & \quad \pm 16 \quad \pm 15 \end{array}$$

$$\begin{array}{ll} P_1 & W \quad \delta = 1.1470 - 0.0063 X_1 \\ & MB \quad \delta = 1.1522 - 0.0039 X_1 \\ & \quad \pm 29 \quad \pm 29 \end{array}$$

$$\begin{array}{ll} K_1 & W \quad \delta = 1.1320 - 0.0063 X_1 \\ & MB \quad \delta = 1.1458 - 0.0059 X_1 \\ & \quad \pm 12 \quad \pm 13 \end{array}$$

Semi-Diurnal waves

$$X_2 = Y_4^2 / Y_2^2 = \frac{\sqrt{3}}{2} (7 \sin^2 \phi - 1)$$

$$\begin{array}{ll} & W \quad \delta = 1.1599 - 0.0045 X_2 \\ & MB \quad \delta = 1.1751 - 0.0046 X_2 \\ & \quad \pm 21 \quad \pm 10 \end{array}$$

W : Wahr theoretical result

MB : Melchior-De Becker experimental result

TABLE 3 Final residue $\vec{X} = \vec{B} - \vec{L} = \vec{A} - \vec{R} - \vec{L}$ (see fig. 1)

	Schwiderski map		Schwiderski map with additions and corrections	
<u>China</u>	X	X	X	X
Shenyang	0.88	-60.5	0.30	7.6
Beijing	0.60	-10.4	0.60	63.8
Tsing Tao	1.57	-48.4	0.85	73.7
Lanzhou	0.74	-55.7	0.48	-54.3
Urumqi	0.67	-11.9	0.56	- 9.3
Wuhan	0.61	-71.3	0.14	39.3
Shanghai	1.74	-128.0	1.68	99.9
Kunming	1.05	-27.8	0.86	-20.9
Guangzhou	0.37	-151.4	0.44	147.6
<u>Korea</u>				
Seoul	1.32	10.4	0.52	46.5
<u>Japan</u>				
Kariya	1.33	-105.3	0.30	-64.3
Kyoto	0.46	-126.3	0.04	133.1
Mean residue	0.95 microgal		0.56 microgal	

The amplitudes are given in microgals ($\sim 10^{-9}$ of g).

TABLE 4 Readjustment of Japanese data by comparison
with our series of registration at Tokyo station

Stations	Observed Residues				Calculated Residues according to Schwiderski maps	
	A		B			
<u>M₂ wave</u>						
Fujigawa	5.15	-11°	2.65	12°	2.59	19°
Yatsugatake	3.88	-17°	1.41	15°	2.03	23°
Yashiko	4.30	- 7°	2.15	24°	1.63	32°
Tokyo	3.86	-14°	(2.51	20°)	2.33	27°
<u>O₁ wave</u>						
Fujigawa	3.84	-10°	2.35	- 6°	2.05	14°
Yatsugatake	2.39	3°	1.07	26°	1.81	15°
Yashiko	3.26	- 7°	1.77	- 1°	1.66	18°
Tokyo	2.97	- 4°	(2.05	7°)	2.04	16°

A Japanese solution

B ICET solution when the gravimeter LCR 34 is corrected by comparison with
GEOD 783 at Tokyo.

Amplitudes are given in microgals ($\sim 10^{-9}$ of g).

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TRANS WORLD PROFILE

SOUTH AMERICA

STATION CURITIBA

STATION 7305 CURITIBA PARANA COMPOSANTE VERTICALE - BRESIL
 25 27 15.3S 49 14 15.6W H 913M P 3M D 80KM
 CENTRO POLITECNICO-GEODESIA-U.F.PR. PROF. C.GEMAEI
 GRAVIMETRE GEODYNAMICS 783 P.MELCHIOR - OBSERVATOIRE ROYAL DE BELGIQUE
 CALIBRATION BRUXELLES - FUNDAMENTAL STATION/NC50.4V/
 INSTALLATION E.DUCARME, C.GEMAEI, J.BITTENCOURT, MILTON CAMPOS
 MAINTENANCE C.GEMAEI, J.BITTENCOURT, MILTON CAMPOS

LEAST SQUARE ANALYSIS / VENEDIKOV FILTERS ON 48 HOURS / PROGRAMMING E.DUCARME
 POTENTIAL CARTWRIGHT-TAYLER-EDDEN / COMPLETE DEVELOPMENT
 COMPUTING CENTER INTERNATIONAL CENTER FOR EARTH TIDES/FAGS/ BRUSSELS
 COMPUTER SPERRY-UNIVAC 1100/81 PROCESSED ON 84/10/29

INERTIAL CORRECTION PROPORTIONAL TO THE SQUARE OF ANGULAR SPEEDS
 NORMALISATION FACTOR .95339
 PHASE LAG 01 .415 M2 .844 01/M2 .492
 CORRECTION FOR ATTENUATION 01 1.00003 M2 1.00011 /MODEL 1/

G783 8311 6/831116 831120/8312 4 8312 8/8312 8 831212/84 1 3 84 1 6/84 124
 G783 84 128/84 213 84 218/84 218 84 221/84 225 84 229/84 425

TIME INTERVAL 173.5 DAYS 3792 READINGS 9 BLOKS

WAVE GROUP ARGUMENT	N WAVE	ESTIMATED AMPL. R.M.S.	AMPL. FACTOR	R.M.S.	PHASE DIFF.	R.M.S.	RESIDUE AMPL.	PHASE
133.-136.	20 Q1	5.66 .07	1.2268	.0160	-.204	.750	.31	176.3
143.-145.	16 01	28.57 .07	1.1855	.0030	-1.379	.146	.93	132.2
152.-155.	15 N01	2.35 .06	1.2408	.0320	1.316	1.478	.16	-160.8
161.-163.	10 P1	12.65 .07	1.1280	.0066	.282	.335	.29	-12.2
164.-168.	23 S1K1	39.04 .07	1.1519	.0021	.084	.105	.49	-173.2
175.-177.	14 J1	2.25 .07	1.1897	.0381	-2.172	1.838	.10	121.4
184.-186.	11 001	1.18 .06	1.1385	.0565	-4.213	2.835	.09	73.3
233.-235.	20 2N2	2.26 .03	1.2080	.0185	4.652	.882	.20	65.8
243.-248.	24 N2	14.12 .05	1.2053	.0038	2.045	.182	.72	44.0
252.-258.	26 M2	71.86 .04	1.1744	.0007	1.759	.036	2.36	69.2
265.-265.	9 L2	2.00 .04	1.1545	.0209	.903	1.032	.03	107.5
267.-273.	9 S2	33.29 .04	1.1696	.0015	1.953	.071	1.16	77.5
274.-277.	12 K2	8.89 .04	1.1476	.0050	2.322	.246	.37	106.1
335.-375.	16 M3	1.21 .02	1.1132	.0228	.432	1.159	.05	10.4

STANDARD DEVIATION D 2.96 SD 1.70 TD .93 MICROGAL
 01/K1 1.0291 1-01/1-K1 1.2210 M2/01 .9906
 CENTRAL EPOCH TJJ= 2445730.0

TRANS WORLD PROFILE

SOUTH AMERICA

STATION CURITIBA

STATION 7305 CURITIBA PARANA COMPOSANTE VERTICALE BRESIL
 25 27 15.3S 49 14 15.6W H 913M P 3M D 80KM
 CENTRO POLITECNICO-GEODESIA-U.F.PR. PPOF. C.GEMAEL
 TRANS WORLD TIDAL GRAVITY PROFILES P. MELCHIOR
 GRAVIMETRE LA COSTE ROMBERG 3 ASSERVISSEMENT ELECTRONIQUE M. VAN RUYMBEEKE
 AJUSTEMENT DE LINEARITE PAR METHODE SATO-HARRISON
 CALIBRATION CURITIBA - STATION FONDAMENTALE
 INSTALLATION M. VAN RUYMBEEKE, E. RATTON
 MAINTENANCE C.GEMAEL, J. BITTENCOURT, MILTON CAMPOS

LEAST SQUARE ANALYSIS / VENEDIKOV FILTERS ON 48 HOURS / PROGRAMMING E. DUCARME
 POTENTIAL CARTWRIGHT-TAYLER-EDDEN / COMPLETE DEVELOPMENT
 COMPUTING CENTER INTERNATIONAL CENTER FOR EARTH TIDES/FAGS/ BRUSSELS
 COMPUTER SPERRY-UNIVAC 1100/81 PROCESSED ON 85/ 3/20

INERTIAL CORRECTION PROPORTIONAL TO THE SQUARE OF ANGULAR SPEEDS
 NORMALISATION FACTOR .98629

G 3 84 729/84 8 2 84 8 8/84 818 84 822/84 9 1 84 9 5/84 917 84 921/84 929
 G 3 8410 5/8410 9 841013/841027

TIME INTERVAL 92.5 DAYS 1824 READINGS 7 BLOKS

WAVE GROUP	ESTIMATED AMPL.	AMPL.	PHASE	RESIDUE
ARGUMENT N WAVE	R.M.S.	FACTOR P.M.S.	DIFF. R.M.S.	AMPL. . PHASE
133.-139. 30 Q1	5.49 .23	1.1890 .0498	-1.472 2.402	.19 133.6
143.-149. 26 O1	28.47 .26	1.1813 .0106	-1.423 .516	.88 126.4
161.-168. 33 P1S1K1	37.60 .29	1.1094 .0086	-1.315 .450	1.29 41.6
243.-248. 24 N2	13.99 .15	1.1940 .0132	2.346 .619	.69 56.1
252.-258. 26 M2	71.86 .16	1.1744 .0027	1.406 .132	1.96 64.1
267.-277. 21 S2K2	33.94 .13	1.1924 .0047	2.946 .223	1.95 63.4
335.-375. 16 M3	1.36 .07	1.2552 .0599	3.134 2.693	.22 20.2

STANDARD DEVIATION D 7.00 SD 4.01 TD 1.78 MICROGAL
 01/K1 1.0648 1-01/1-K1 1.6568 M2/01 .9942
 CENTRAL EPOCH TJJ= 2445956.0

TRANS WORLD PROFILE

SOUTH AMERICA

STATION CURITIBA

STATION 7305 CURITIBA PARANA COMPOSANTE VERTICALE BRESIL
 25 27 15.3S 49 14 15.6W H 913M P 3M D 80KM
 CENTRO POLITECNICO-GEODESIA-U.F.PR. PROF. C.GEMAEI
 GRAVIMETRE LA COSTE ROMBERG 3 TRANS WORLD TIDAL GRAVITY PROFILES P.MELCHIOR
 CALIBRATION CURITIBA - STATION FONDAMENTALE
 INSTALLATION C.POITEVIN,E.RATTON
 MAINTENANCE C.GEMAEI,J.EITTENCOURT,MILTON CAMPOS

LEAST SQUARE ANALYSIS / VENEDIKOV FILTERS ON 48 HOURS / PROGRAMMING B.DUCARME
 POTENTIAL CARTWRIGHT-TAYLER-EDDEN / COMPLETE DEVELOPMENT
 COMPUTING CENTER INTERNATIONAL CENTER FOR EARTH TIDES/FAGS/ BRUSSELS
 COMPUTER SPERRY-UNIVAC 1100/81 PROCESSED ON 85/ 3/21

INERTIAL CORRECTION PROPORTIONAL TO THE SQUARE OF ANGULAR SPEEDS
 NORMALISATION FACTOR .91554
 PHASE LAG 01 2.390 M2 2.268 C1/M2 1.054
 CORRECTION FOR DIFFERENTIAL ATTENUATION M2/01 1.03078 /MODEL 2/

G 3 84 523/84 529 84 6 2/84 624 84 628/84 720

TIME INTERVAL 60.0 DAYS 1344 READINGS 3 BLOKS

WAVE GROUP	ESTIMATED AMPL.	AMPL.	PHASE	RESIDUE
ARGUMENT N WAVE	R.M.S.	FACTOR R.M.S.	DIFF. R.M.S.	AMPL. PHASE
133.-139. 30 Q1	5.85 .37	1.2669 .0807	-.616 3.622	.50 172.8
143.-149. 26 01	28.87 .30	1.1982 .0123	-1.165 .593	1.10 147.8
161.-168. 33 P1S1K1	39.12 .25	1.1542 .0074	-1.776 .363	1.33 114.2
243.-248. 24 N2	14.72 .24	1.2567 .0203	3.647 .954	1.45 40.4
252.-258. 26 M2	71.86 .19	1.1745 .0030	1.361 .152	1.91 63.3
267.-277. 21 S2K2	34.47 .25	1.2109 .0087	1.401 .417	1.67 30.4
335.-375. 16 M3	1.31 .19	1.2101 .1775	-7.667 8.719	.23 -50.7

STANDARD DEVIATION D 7.21 SD 4.09 TD 4.27 MICROGAL
 01/K1 1.0381 1-01/1-K1 1.2852 M2/C1 .9802
 CENTRAL EPOCH TJJ= 2445872.0

TRANS WORLD PROFILE

SOUTH AMERICA

STATION CURITIBA

STATION 7305 CURITIBA PARANA COMPOSANTE VERTICALE BRESIL
 25 27 15.3S 49 14 15.6W H 913M P 3M D 80KM
 CENTRO POLITECNICO-GEODESIA-U.F.PR. PROF. C.GEMAEL
 TRANS WORLD TIDAL GRAVITY PROFILES P. MELCHIOR
 GRAVIMETRE LACOSTE ROMBERG 8 ASSERVISSEMENT ELECTRONIQUE M. VAN RUYMBEKE
 AJUSTEMENT DE LINEARITE PAR METHODE SATO-HARRISON
 CALIBRATION CURITIBA - STATION FONDAMENTALE
 INSTALLATION M. VAN RUYMBEKE, E. RATTON
 MAINTENANCE C.GEMAEL, J. BITTENCOURT, MILTON CAMPOS

LEAST SQUARE ANALYSIS / VENEDIKOV FILTERS ON 48 HOURS / PROGRAMMING E. DUCARME
 POTENTIAL CARTWRIGHT-TAYLER-EDDEN / COMPLETE DEVELOPMENT
 COMPUTING CENTER INTERNATIONAL CENTER FOR EARTH TIDES/FAGS/ BRUSSELS
 COMPUTER SPERRY-UNIVAC 1100/81 PROCESSED ON 85/ 3/20

INERTIAL CORRECTION PROPORTIONAL TO THE SQUARE OF ANGULAR SPEEDS
 NORMALISATION FACTOR 1.00230

G 8 84 729/84 8 6 84 6 9/84 9 6 84 922/84 924 84 929/84 929 8410 3/841013
 G 8 841017/841029 8411 5/8411 9

TIME INTERVAL 105.0 DAYS 1872 READINGS 7 BLOKS

WAVE GROUP	ESTIMATED AMPL.	AMPL.	PHASE	RESIDUE
ARGUMENT N WAVE	R.M.S.	FACTOR P.M.S.	DIFF. R.M.S.	AMPL. PHASE
133.-139. 30 Q1	5.48 .18	1.1868 .0385	.094 1.270	.13 -175.9
143.-149. 26 O1	28.27 .19	1.1732 .0080	-1.165 .389	.66 119.9
161.-168. 33 P1S1K1	39.09 .21	1.1536 .0063	-.395 .314	.60 153.5
243.-248. 24 N2	13.58 .18	1.1590 .0157	.969 .771	.23 93.7
252.-258. 26 M2	71.85 .20	1.1744 .0033	1.347 .160	1.89 63.2
267.-277. 21 S2K2	33.34 .16	1.1711 .0058	1.603 .279	.98 72.1
335.-375. 16 M3	1.20 .06	1.1031 .0590	-1.824 3.028	.05 -44.9

STANDARD DEVIATION D 5.49 SD 5.10 TD 1.76 MICROGAL
 01/K1 1.0170 1-01/1-K1 1.1279 M2/01 1.0009
 CENTRAL EPOCH TJJ= 2445962.0

TRANS WORLD PROFILE

SOUTH AMERICA

STATION CURITIBA

STATION 7305 CURITIBA PARANA COMPOSANTE VERTICALE BRESIL
 25 27 15.35 49 14 15.6W H 913M P 3M D 80KM
 CENTRO POLITECNICO-GEODESIA-U.F.PR. PROF. C.GEMAEL
 GRAVIMETRE LA COSTE ROMBERG 8 TRANS WORLD TIDAL GRAVITY PROFILES P.MELCHIOR
 CALIBRATION CURITIBA - STATION FONDAMENTALE
 INSTALLATION C.POITEVIN,E.RATTON
 MAINTENANCE C.GEMAEL,J.BITTENCOURT,MILTON CAMPOS

LEAST SQUARE ANALYSIS / VENEDIKOV FILTERS ON 48 HOURS / PROGRAMMING B.DUCARME
 POTENTIAL CARTWRIGHT-TAYLER-EDDEN / COMPLETE DEVELOPMENT
 COMPUTING CENTER INTERNATIONAL CENTER FOR EARTH TIDES/FAGS/ BRUSSELS
 COMPUTER SPERRY-UNIVAC 1100/81 PROCESSED ON 85/ 3/21

INERTIAL CORRECTION PROPORTIONAL TO THE SQUARE OF ANGULAR SPEEDS
 NORMALISATION FACTOR .96620
 PHASE LAG 01 1.366 M2 1.633 G1/M2 .836
 CORRECTION FOR DIFFERENTIAL ATTENUATION M2/01 1.01912 /MODEL 2/

G 8 84 520/24 6 9 84 614/84 722

TIME INTERVAL 59.0 DAYS 1344 READINGS 2 BLOCKS

WAVE GROUP	ESTIMATED AMPL.	AMPL.	PHASE	RESIDUE
ARGUMENT N. WAVE	P.M.S.	FACTOR P.M.S.	DIFF.	R.M.S. AMPL. PHASE
133.-139. 30 Q1	6.23 .41	1.3510 .0891	-.811	3.766 .89 174.3
143.-149. 26 01	26.30 .34	1.1746 .0140	-1.165	.686 .68 122.2
161.-168. 33 P1S1K1	38.43 .28	1.1341 .0083	-.056	.414 .13 17.5
243.-248. 24 M2	15.17 .31	1.2950 .0266	2.331	1.200 1.68 21.5
252.-258. 26 M2	71.86 .25	1.1744 .0041	1.361	.203 1.91 63.4
267.-277. 21 S2K2	34.03 .34	1.1954 .0119	1.840	.572 1.47 47.9
335.-375. 16 M3	1.14 .10	1.0489 .0883	-12.186	4.920 .24 -100.8

STANDARD DEVIATION D 8.34 SD 5.50 TD 2.11 MICROGAL
 01/K1 1.0357 1-01/1-K1 1.3019 M2/01 .9999
 CENTRAL EPOCH TJJ= 2445875.0

TRANS WORLD PROFILE

SOUTH AMERICA

STATION CURITIBA

STATION 7305 CURITIBA PARANA COMPOSANTE VERTICALE BRESIL
 25 27 15.35 49 14 15.6W H 913M P 3M D 80KM
 CENTRO POLITECNICO-GEODESIA-U.F.PR. PROF. C.GEMAEL
 TRANS WORLD TIDAL GRAVITY PROFILES P. MELCHIOR
 GRAVIMETRE LACOSTE ROMBERG D 32 ASSERVISSEMENT ELECTRONIQUE M. VAN RUYMBEKE
 AJUSTEMENT DE LINEARITE PAR METHODE SATO-HARRISON
 CALIBRATION CURITIBA - STATION FONDAMENTALE
 INSTALLATION M. VAN RUYMBEKE, E. RATTON
 MAINTENANCE C.GEMAEL, J.BITTENCOURT, MILTON CAMPOS

LEAST SQUARE ANALYSIS / VENEDIKOV FILTERS ON 48 HOURS / PROGRAMMING E.DUCARME
 POTENTIAL CARTWRIGHT-TAYLER-EDDEN / COMPLETE DEVELOPMENT
 COMPUTING CENTER INTERNATIONAL CENTER FOR EARTH TIDES/FACS/ ERUSSELS
 COMPUTER SPERRY-UNIVAC 1100/81 PROCESSED ON 85/ 3/20

INERTIAL CORRECTION PROPORTIONAL TO THE SQUARE OF ANGULAR SPEEDS
 NORMALISATION FACTOR .99592

G 32 84 729/84 8 4 84 812/84 925 8410 3/841027

TIME INTERVAL 92.5 DAYS 1920 READINGS 3 BLOKS

WAVE GROUP	ESTIMATED AMPL.	AMPL.	PHASE	RESIDUE
ARGUMENT N WAVE	R.M.S.	FACTOR P.M.S.	DIFF. R.M.S.	AMPL. PHASE
133.-139. 30 Q1	5.62 .27	1.2178 .0589	-5.357 2.780	.58 115.0
143.-149. 26 O1	28.84 .30	1.1966 .0126	-.906 .604	1.01 153.0
161.-168. 33 P1S1K1	37.11 .36	1.0950 .0105	-2.474 .553	2.18 47.3
243.-248. 24 N2	14.23 .13	1.2146 .0108	2.416 .507	.87 43.8
252.-258. 26 M2	71.86 .14	1.1744 .0023	1.329 .110	1.87 62.8
267.-277. 21 S2K2	33.46 .11	1.1753 .0039	2.312 .189	1.41 73.2
335.-375. 16 M3	1.21 .07	1.1182 .0610	-.959 3.089	.06 -20.2

STANDARD DEVIATION D 8.81 SD 3.63 TD 1.84 MICROGAL
 01/K1 1.0928 1-01/1-K1 2.0697 M2/01 .9815
 CENTRAL EPOCH TJJ= 2445956.0

TRANS WORLD PROFILE

SOUTH AMERICA

STATION CURITIBA

STATION 7305 CURITIBA PARANA COMPOSANTE VERTICALE BRESIL
 25 27 15.3S 49 14 15.6W H 913M P 3M D 60KM
 CENTRO POLITECNICO-GEODESIA-U.F.PR. PROF. C.GEMAEL
 GRAVIMETRE LA COSTE ROMBERG D32 TRANS WORLD TIDAL GRAVITY PROFILES P.MELCHIOR
 CALIBRATION CURITIBA - STATION FONDAMENTALE
 INSTALLATION C.POITEVIN,E.RATTON
 MAINTENANCE C.GEMAEL,J.BITTENCOURT,MILTON CAMPOS

LEAST SQUARE ANALYSIS / VENEDIKOV FILTERS ON 48 HOURS / PROGRAMMING B.DUCARME
 POTENTIAL CARTWRIGHT-TAYLER-EDDEN / COMPLETE DEVELOPMENT
 COMPUTING CENTER INTERNATIONAL CENTER FOR EARTH TIDES/FAGS/ BRUSSELS
 COMPUTER SPERRY-UNIVAC 1100/81 PROCESSED ON 85/ 3/21

INERTIAL CORRECTION PROPORTIONAL TO THE SQUARE OF ANGULAR SPEEDS
 NORMALISATION FACTOR .92619
 PHASE LAG 01 2.249 M2 1.381 01/M2 1.629
 CORRECTION FOR DIFFERENTIAL ATTENUATION M2/01 1.01747 /MODEL 2/

6 32 84 430/84 5 4 84 510/84 6 9 84 613/84 623 84 628/84 7 6 84 710/84 720

TIME INTERVAL 83.0 DAYS 1728 READINGS 5 BLOKS

WAVE GROUP	ESTIMATED AMPL.	AMPL.	PHASE	PESIDUE
ARGUMENT N WAVE	R.M.S.	FACTOR P.M.S.	DIFF. R.M.S.	AMPL. PHASE
133.-139. 30 Q1	5.47 .19	1.1850 .0409	-2.087 1.983	.23 119.8
143.-149. 26 01	28.22 .16	1.1712 .0067	-1.165 .326	.64 116.0
161.-168. 33 P1S1K1	38.95 .14	1.1493 .0040	-1.149 .197	.87 116.4
243.-248. 24 N2	14.07 .12	1.2007 .0104	.491 .504	.49 14.2
252.-258. 26 M2	71.85 .10	1.1744 .0017	1.361 .082	1.91 63.5
267.-277. 21 S2K2	33.45 .12	1.1751 .0042	2.247 .202	1.37 73.0
335.-375. 16 M3	1.28 .12	1.1759 .1124	4.240 5.549	.15 39.5

STANDARD DEVIATION D 4.41 SD 2.49 TD 3.06 MICROGAL
 01/K1 1.0190 1-01/1-K1 1.1467 M2/01 1.0027
 CENTRAL EPOCH TJJ= 2445861.0

TRANS WORLD PROFILE

SOUTH AMERICA

STATION CURITIBA

STATION 7305 CURITIBA PARANA COMPOSANTE VERTICALE BRESIL
 25 27 15.3S 49 14 15.6W H 913M P 3M D 80KM
 CENTRO POLITECNICO-GEODESIA-U.F.PR. PROF. C.GEMAEL
 GRAVIMETRE LA COSTE ROMBERG D 99 ASSERVISSEMENT ELECTRONIQUE M. VAN RUYMBEKE
 AJUSTEMENT DE LINEARITE PAR METHODE SATO-HARRISON
 INSTALLATION M. VAN RUYMBEKE, E. RATTON
 MAINTENANCE C.GEMAEL, J.BITTENCOURT, MILTON CAMPOS

LEAST SQUARE ANALYSIS / VENEDIKOV FILTERS ON 48 HOURS / PROGRAMMING B.DUCARME
 POTENTIAL CARTWRIGHT-TAYLER-EDDEN / COMPLETE DEVELOPMENT
 COMPUTING CENTER INTERNATIONAL CENTER FOR EARTH TIDES/FAGS/ BRUSSELS
 COMPUTER SPERRY-UNIVAC 1100/81 PROCESSED ON 85/ 3/20

INEPTIAL COPRECTION PROPORTIONAL TO THE SQUARE OF ANGULAR SPEEDS
 NORMALISATION FACTOR 1.10496

G 99 84 729/84 8 6 84 8 9/84 823 84 826/84 9 7 84 927/84 929 8410 3/841025

TIME INTERVAL 90.5 DAYS 1632 READINGS 5 BLOKS

WAVE GROUP	ESTIMATED AMPL.	AMPL.	PHASE	RESIDUE
ARGUMENT N WAVE	R.M.S.	FACTOR R.M.S.	DIFF. R.M.S.	AMPL. PHASE
133.-139. 30 Q1	5.63 .20	1.2202 .0443	-2.583 2.075	.37 137.3
143.-149. 26 O1	28.66 .23	1.1895 .0094	-.653 .452	.80 155.7
161.-168. 33 P1S1K1	38.91 .25	1.1482 .0074	-1.063 .373	.80 116.0
243.-248. 24 N2	14.15 .19	1.2078 .0163	2.798 .771	.88 51.9
252.-258. 26 M2	71.86 .21	1.1744 .0034	1.323 .164	1.87 62.7
267.-277. 21 S2K2	33.24 .17	1.1676 .0061	1.875 .292	1.11 79.7
335.-375. 16 M3	1.24 .09	1.1395 .0858	1.117 4.257	.08 17.2

STANDARD DEVIATION D 6.09 SD 5.03 TD 2.39 MICROGAL
 01/K1 1.0359 1-01/1-K1 1.2785 M2/01 .9873
 CENTRAL EPOCH TJJ= 2445955.0

TRANS WORLD PROFILE

SOUTH AMERICA

STATION CURITIBA

STATION 7305 CURITIBA PARANA COMPOSANTE VERTICALE BRESIL
 25 27 15.3S 49 14 15.6W H 913M P 3M D 80KM
 CENTRO POLITECNICO-GEODESIA-U.F.PR. PROF. C.GEMAEI
 GRAVIMETRE LA COSTE ROMBERG MODELE D 99
 INSTALLATION E. RATTON
 MAINTENANCE C.GEMAEI, J. BITTENCOURT, MILTON CAMPOS

LEAST SQUARE ANALYSIS / VENEDIKOV FILTERS ON 48 HOURS / PROGRAMMING B.DUCARME
 POTENTIAL CARTWRIGHT-TAYLER-EDDEN / COMPLETE DEVELOPMENT
 COMPUTING CENTER INTERNATIONAL CENTER FOR EARTH TIDES/FAGS/ BRUSSELS
 COMPUTER SPERRY-UNIVAC 1100/81 PROCESSED ON 85/ 3/21

INERTIAL CORRECTION PROPORTIONAL TO THE SQUARE OF ANGULAR SPEEDS
 NORMALISATION FACTOR .99022
 PHASE LAG 01 5.385 M2 4.391 01/M2 1.228
 CORRECTION FOR DIFFERENTIAL ATTENUATION M2/C1 1.06289 /MODEL 2/

G 99 84 521/84 612 84 618/84 626 84 7 6/84 710 84 714/84 714 84 722/84 724

TIME INTERVAL 66.5 DAYS 1104 READINGS 5 BLOKS

WAVE GROUP	ESTIMATED AMPL.	AMPL.	PHASE	RESIDUE
ARGUMENT N WAVE	R.M.S.	FACTOR R.M.S.	DIFF. R.M.S.	AMPL. PHASE
133.-139. 30 Q1	5.57 1.18	1.2064 .2563	8.662 11.975	.87 -99.9
143.-149. 26 01	28.33 .92	1.1755 .0384	-1.165 1.864	.69 123.7
161.-168. 33 P1S1K1	38.52 .73	1.1365 .0215	-2.299 1.073	1.55 87.5
243.-248. 24 N2	15.24 1.14	1.3008 .0972	11.849 4.513	3.40 67.1
252.-258. 26 M2	71.86 .89	1.1744 .0145	1.361 .748	1.91 63.4
267.-277. 21 S2K2	32.26 1.05	1.1332 .0367	-2.644 1.960	1.69 -118.3
335.-375. 16 M3	1.39 .47	1.2766 .4289	11.779 20.807	.35 55.0

STANDARD DEVIATION D 17.89 SD 15.07 TD 9.28 MICROGAL
 01/K1 1.0343 1-01/1-K1 1.2853 M2/01 .9991
 CENTRAL EPOCH TJJ= 2445874.0

TRANS WORLD PROFILE

SOUTH AMERICA

STATION SANTA MARIA

STATION 7306 SANTA MARIA RIO GRANDE DO SUL COMPOSANTE VERTICALE ERESIL
 29 40 17S 53 49 22W H 700M P 2M D 330KM
 DEPOTS SEDIMENTAIRES SUR BASALTE
 DEPT. DE INGENIERIA RURAL-UNIV. FED. DE SANTA MARIA PROF. E.LEVISKI
 CENTRO POLITECNICO-GEODESIA-U.F.PR. PROF. C.GEMAEI
 GRAVIMETRE LACOSTE POMBERG D 32 TRANS WORLD TIDAL GRAVITY PROFILES P.MELCHIOR
 CALIBRATION CURITIBA - STATION FONDAMENTALE
 INSTALLATION E.DUCARME, J.PITTENCOURT
 MAINTENANCE E.LEVISKI, LUIZ A.AITA

LEAST SQUARE ANALYSIS / VENEDIKOV FILTERS ON 48 HOURS / PROGRAMMING E.DUCARME
 POTENTIAL CARTWRIGHT-TAYLER-EDDEN / COMPLETE DEVELOPMENT
 COMPUTING CENTER INTERNATIONAL CENTER FOR EARTH TIDES/FAGS/ BRUSSELS
 COMPUTER SPERRY-UNIVAC 1100/81 PROCESSED ON 85/ 3/21

INERTIAL CORRECTION PROPORTIONAL TO THE SQUARE OF ANGULAR SPEEDS
 NORMALISATION FACTOR .92619
 PHASE LAG 01 2.249 M2 1.381 01/M2 1.629
 CORRECTION FOR DIFFERENTIAL ATTENUATION M2/01 1.01747 /MODEL 2/

G 32 8311 3/8311 5 8311 9/831121 831125/8312 1 8312 6/831210 831213/831223
 G 32 84 112/84 114 84 118/84 2 5 84 210/84 212 84 3 9/84 331 84 4 5/84 416
 G 32 84 422/84 424

TIME INTERVAL 175.0 DAYS 2640 READINGS 11 BLOKS

WAVE GROUP ARGUMENT	N WAVE	ESTIMATED AMPL. R.M.S.	AMPL. FACTOR	P.M.S.	PHASE DIFF.	R.M.S.	RESIDUE AMPL.	PHASE
133.-136.	20 Q1	5.77 .22	1.1282	.0440	-4.045	2.217	.44	66.8
143.-145.	16 01	30.96 .24	1.1589	.0089	-1.244	.434	.67	88.4
152.-155.	15 N01	2.86 .19	1.3610	.0922	-.484	3.884	.43	176.7
161.-163.	10 P1	14.18 .23	1.1402	.0182	-3.270	.916	.83	76.8
164.-168.	23 S1K1	41.54 .23	1.1058	.0061	-1.369	.321	1.56	39.4
175.-177.	14 J1	2.40 .23	1.1403	.1072	-4.964	5.397	.21	75.6
184.-186.	11 001	1.10 .17	.9536	.1495	4.452	9.015	.26	-19.4
233.-23X.	20 2N2	2.16 .13	1.2492	.0771	-4.626	3.510	.23	-49.8
243.-245.	24 N2	12.66 .17	1.1664	.0153	.317	.761	.10	45.6
252.-258.	26 M2	64.83 .16	1.1440	.0028	.214	.142	.94	165.1
265.-265.	9 L2	1.90 .12	1.1861	.0753	3.817	3.699	.13	73.5
267.-273.	9 S2	30.15 .15	1.1435	.0055	.378	.279	.48	155.6
274.-277.	12 K2	8.24 .13	1.1486	.0186	.019	.944	.08	170.1
335.-375.	16 M3	1.21 .09	1.2549	.0910	4.935	4.197	.21	30.5

STANDARD DEVIATION D 6.62 SD 4.70 TD 2.82 MICROGAL
 01/K1 1.0480 1-01/1-K1 1.5018 M2/01 .9872
 CENTRAL EPOCH TJJ= 2445728.C

TRANS WORLD PROFILE

SOUTH AMERICA

STATION CAMPO GRANDE

STATION 7307 CAMPO GRANDE MATTO GROSSO DO SUL COMPOSANTE VERTICALE BRESIL
 20 27 49S 54 36 55W H 450M P OM D 1000KM
 FORMATION SABLEUSE (ARENITO CAMA) 40M SUP BASALTE
 DPT. DE HIDPAULICA E TRANSPORTE - UNIV. FED. DE MATTO GROSSO DO SUL
 CENTRO POLITECNICO-GEODESIA-U.F.PR. PROF. C.GEMAEI
 GRAVIMETRE LACOSTE ROMBERG 8 TRANS WORLD TIDAL GRAVITY PROFILES P.MELCHIOR
 CALIBRATION BRUXELLES - STATION FONDAMENTALE
 INSTALLATION C.POITEVIN, E.RATTON
 MAINTENANCE L.M.NUNES CARNEIRO, A.INACIO ARAUJO, JORGE GONDA

LEAST SQUARE ANALYSIS / VENEDIKOV FILTERS ON 48 HOURS / PROGRAMMING P.DUCARME
 POTENTIAL CARTWRIGHT-TAYLER-EDDEN / COMPLETE DEVELOPMENT
 COMPUTING CENTER INTERNATIONAL CENTER FOR EARTH TIDES/FAGS/ PRUSSELS
 COMPUTER SPERRY-UNIVAC 110C/81 PROCESSED ON 85/ 3/21

INERTIAL CORRECTION PROPORTIONAL TO THE SQUARE OF ANGULAR SPEEDS
 NORMALISATION FACTOR .96620
 PHASE LAG 01 1.366 M2 1.633 01/M2 .836
 CORRECTION FOR DIFFERENTIAL ATTENUATION M2/01 1.01912 /MODEL 2/

G 3 831113/831119 831125/831219 831229/84 124 24 129/84 131 24 2 6/84 2 6
 G 8 84 310/84 312 84 4 7/84 4 9

TIME INTERVAL 150.0 DAYS 1824 READINGS 7 BLOKS

WAVE GROUP	ESTIMATED AMPL.	AMPL.	PHASE	RESIDUE
ARGUMENT N WAVE	R.M.S.	FACTOR P.M.S.	DIFF. R.M.S.	AMPL. PHASE
133.-139. 30 Q1	5.00 .72	1.2651 .1839	-2.622 0.202	.54 154.7
143.-149. 26 01	23.19 .68	1.1405 .0335	-1.114 1.676	.59 49.4
161.-168. 33 P1S1K1	33.05 .57	1.1559 .0199	-3.289 .972	1.95 103.9
243.-248. 24 N2	14.30 .43	1.1337 .0339	.633 1.733	.37 154.6
252.-258. 26 M2	77.66 .40	1.1792 .0060	1.708 .296	2.62 62.2
267.-277. 21 S2K2	36.29 .42	1.1643 .0137	-1.437 .671	1.17 -51.2
335.-375. 16 M3	1.20 .22	.9925 .1847	-3.843 10.850	.12 -139.2

STANDARD DEVIATION D 18.83 SD 9.85 TD 5.72 MICROGAL
 01/K1 .9867 1-01/1-K1 .9014 M2/01 1.0339
 CENTRAL EPOCH TJJ= 2445726.0

TRANS WORLD PROFILE

SOUTH AMERICA

STATION VICOSA

STATION 7308 VICOSA MINAS GERAIS COMPOSANTE VERTICALE BRESIL
 20 45 20S 42 52 04W H 650M P 0M D 400KM
 DEPT. DE ENG. CIVIL - UNIV. FED. DE VICOSA PROF. A. S. FERRAZ
 CENTRO POLITECNICO-GEODESIA-U.F.PR. PROF. C. GEMAEI
 GRAVIMETRE LA COSTE ROMBERG 3 TRANS WORLD TIDAL GRAVITY PROFILES P. MELCHIOR
 CALIBRATION BRUXELLES - STATION FONDAMENTALE
 INSTALLATION C. POITEVIN, E. RATTON
 MAINTENANCE A. S. FERRAZ, A. S. SILVA, J. GRIPP JR.

LEAST SQUARE ANALYSIS / VENEDIKOV FILTERS ON 48 HOURS / PROGRAMMING B. DUCARME
 POTENTIAL CARTWRIGHT-TAYLER-EDDEN / COMPLETE DEVELOPMENT
 COMPUTING CENTER INTERNATIONAL CENTER FOR EARTH TIDES/FAGS/ BRUSSELS
 COMPUTER SPERRY-UNIVAC 1100/81 PROCESSED ON 85/ 3/21

INERTIAL CORRECTION PROPORTIONAL TO THE SQUARE OF ANGULAR SPEEDS
 NORMALISATION FACTOR .97410
 PHASE LAG 01 1.350 M2 1.240 01/M2 1.089
 CORRECTION FOR DIFFERENTIAL ATTENUATION M2/01 1.01693 /MODEL 2/

G	3	831030/831111	831115/831121	831127/8312 3	8312 8/831216	831221/84 110
G	3	84 116/84 124	84 2 2/84 2 8	84 217/84 217	84 220/84 222	84 3 1/84 3 9
G	3	84 313/84 317	84 322/84 322	84 326/84 4 1	84 411/84 411	

TIME INTERVAL 166.5 DAYS 2736 READINGS 14 BLOKS

WAVE GROUP	ESTIMATED AMPL.	AMPL.	PHASE	RESIDUE
ARGUMENT N WAVE	R.M.S.	FACTOR P.M.S.	DIFF. R.M.S.	AMPL. PHASE
133.-136. 20 Q1	4.65 .30	1.1805 .0771	-4.812 3.700	.40 99.7
143.-145. 16 01	24.66 .31	1.1985 .0150	-2.547 .722	1.35 125.5
152.-155. 15 N01	1.88 .27	1.1628 .1679	4.383 8.193	.14 -90.4
161.-163. 10 P1	12.77 .29	1.3341 .0307	1.058 1.316	1.74 -172.2
164.-168. 23 S1K1	34.43 .30	1.1899 .0103	-2.565 .501	2.14 133.8
175.-177. 14 J1	2.26 .30	1.3962 .1838	8.578 7.523	.49 -136.5
184.-186. 11 001	1.28 .24	1.4440 .2661	-8.590 10.565	.30 141.1
233.-23X. 20 2N2	2.21 .13	1.0995 .0626	6.113 3.276	.27 119.7
243.-248. 24 N2	15.40 .16	1.2261 .0128	2.143 .603	1.00 35.1
252.-258. 26 M2	78.44 .16	1.1956 .0024	1.771 .115	3.34 46.6
265.-265. 9 L2	2.13 .13	1.1472 .0716	3.327 3.612	.13 102.5
267.-273. 9 S2	37.02 .14	1.2129 .0046	2.114 .217	2.09 40.7
274.-277. 12 K2	10.15 .14	1.2224 .0166	.219 .783	.52 4.3
335.-375. 16 M3	1.28 .09	1.0665 .0706	-.401 3.768	.01 -96.7

STANDARD DEVIATION D 9.22 SD 4.64 TD 2.79 MICROGAL
 01/K1 1.0072 1-01/1-K1 1.0451 M2/01 .9976
 CENTRAL EPOCH TJJ= 2445720.0

TRANS WORLD PROFILE

SOUTH AMERICA

STATION CUIABA

STATION 7309 CUIABA MATTO GROSSO N COMPOSANTE VERTICALE BRESIL
 15 36 33 S 56 07 34 W H 154 P 0M D 1882KM
 PRECAMBRIAN, PHYLLITES AND QUARTZITES, LOW GRADE METAMORPHIC ROCK
 UNIVERSIDADE FEDERAL DE MATTO GROSSO - DEPARTAMENTO DE GEOLOGIA
 GRAVIMETRE GEODYNAMICS 783 P. MELCHIOR - OBSERVATOIRE ROYAL DE BELGIQUE
 CALIBRATION BRUXELLES - FUNDAMENTAL STATION/NC50.4V/
 INSTALLATION C. POITEVIN, E. RATTON
 MAINTENANCE N. NAVEEN CHANDRA, K. J. ALBRECHT

LEAST SQUARE ANALYSIS / VENEDIKOV FILTERS ON 48 HOURS / PROGRAMMING B. DUCARME
 POTENTIAL CARTWRIGHT-TAYLER-EDDEN / COMPLETE DEVELOPMENT
 COMPUTING CENTER INTERNATIONAL CENTER FOR EARTH TIDES/FAGS/ BRUSSELS
 COMPUTER SPERRY-UNIVAC 1100/81 PROCESSED ON 85/ 3/13

INERTIAL CORRECTION PROPORTIONAL TO THE SQUARE OF ANGULAR SPEEDS

NORMALISATION FACTOR .95339

PHASE LAG 01 .415 M2 .844 01/M2 .492

CORRECTION FOR ATTENUATION 01 1.00003 M2 1.00011 /MODEL 1/

6783 841128/841210 841214/841214 841218/841220 85 1 3/85 1 9 85 113/85 129

TIME INTERVAL 64.5 DAYS 1104 READINGS 5 BLOKS

WAVE GROUP	ESTIMATED AMPL.	AMPL.	PHASE	RESIDUE
ARGUMENT N WAVE	R.M.S.	FACTOR R.M.S.	DIFF. R.M.S.	AMPL. PHASE
133.-139. 30 Q1	3.34 .14	1.0834 .0465	2.551 2.482	.28 -32.0
143.-149. 26 01	18.63 .11	1.1581 .0011	.404 .353	.13 -81.2
161.-168. 33 P1S1K1	26.00 .09	1.1495 .0041	2.294 .203	1.07 -103.4
243.-248. 24 M2	15.47 .24	1.1614 .0182	1.379 .897	.37 88.0
252.-258. 26 M2	81.31 .20	1.1685 .0028	1.427 .135	2.10 74.5
267.-277. 21 S2K2	37.76 .22	1.1663 .0068	2.122 .334	1.41 82.8
335.-375. 16 M3	1.46 .04	1.1107 .0337	3.767 1.744	.11 60.7

STANDARD DEVIATION 0 2.49 SD 3.61 TD .87 MICROGAL

01/K1 1.0075 1-01/1-K1 1.0574 M2/01 1.0090

CENTRAL EPOCH TJJ= 2446064.0

TRANS WORLD PROFILE

SOUTH AMERICA

STATION GOIANIA

STATION 7310 GOIANIA GOIAS COMPOSANTE VERTICALE BRESIL
 16 37 13 S 49 15 19W H 764M P DM D 875KM
 GNAISSES DO COMPLEXO BASAL GOIANO(PRECAMBRIANO), LATOSSOLO VERMELHO-AMARELADO
 UNIVERSIDADE FEDERAL DE GOIAS - INSTITUTO DE QUIMICA E GEOCIENCIAS
 GRAVIMETRE GEODYNAMICS 783 P.MELCHIOR - OBSERVATOIRE ROYAL DE BELGIQUE
 CALIBRATION BRUXELLES - FUNDAMENTAL STATION/NC50.4V/
 INSTALLATION C.POITEVIN,E.RATTON
 MAINTENANCE J.VANDERLIN,E.DE OLIVEIRA COSTA,J.E.ALBUQUERQUE

LEAST SQUARE ANALYSIS / VENEDIKOV FILTERS ON 48 HOURS / PROGRAMMING B.DUCARME
 POTENTIAL CARTWRIGHT-TAYLER-EDDEN / COMPLETE DEVELOPMENT
 COMPUTING CENTER INTERNATIONAL CENTER FOR EARTH TIDES/FAGS/ BRUSSELS
 COMPUTER SPERRY-UNIVAC 1100/81 PROCESSED ON 85/ 1/18

INERTIAL CORRECTION PROPORTIONAL TO THE SQUARE OF ANGULAR SPEEDS
 NORMALISATION FACTOR .95339
 PHASE LAG 01 .415 M2 .844 01/M2 .492
 CORRECTION FOR ATTENUATION 01 1.00003 M2 1.00011 /MODEL 1/

G783 84 5 4/84 6 1 84 6 5/84 621 84 628/84 7 2 84 7 5/84 7 7 84 712/84 716
 G783 84 8 7/8410 4 8410 9/841017 841024/841113 841117/841117

TIME INTERVAL 199.0 DAYS 3792 READINGS 9 BLOKS

WAVE GROUP	ESTIMATED AMPL.	AMPL.	PHASE	RESIDUE
ARGUMENT N WAVE	R.M.S.	FACTOR R.M.S.	DIFF. R.M.S.	AMPL. PHASE
133.-136. 20 Q1	4.04 .09	1.2395 .0280	-.176 1.291	.26 177.3
143.-145. 16 01	19.75 .09	1.1607 .0055	-.622 .271	.22 96.2
152.-155. 15 N01	1.51 .07	1.1279 .0492	4.748 2.491	.13 -69.7
161.-163. 10 P1	9.15 .10	1.1561 .0128	.461 .631	.08 -104.6
164.-168. 23 S1K1	27.51 .09	1.1498 .0039	-1.703 .193	.86 108.9
175.-177. 14 J1	1.72 .09	1.2676 .0654	-1.285 2.894	.17 167.1
184.-186. 11 001	.75 .07	1.0239 .0896	-5.245 4.999	.12 33.6
233.-23X. 20 2N2	2.32 .07	1.1024 .0317	1.654 1.641	.14 151.3
243.-248. 24 N2	15.57 .08	1.1802 .0063	2.441 .306	.71 69.2
252.-258. 26 M2	80.67 .08	1.1711 .0012	1.862 .059	2.72 74.6
265.-265. 9 L2	2.32 .10	1.1928 .0491	4.634 2.350	.20 73.4
267.-273. 9 S2	37.66 .08	1.1751 .0026	1.511 .126	1.10 64.5
274.-277. 12 K2	10.08 .07	1.1556 .0082	1.681 .406	.30 98.3
335.-375. 16 M3	1.43 .02	1.1071 .0186	2.031 .958	.07 45.1

STANDARD DEVIATION D 3.72 SD 3.13 TC .29 MICROGAL
 01/K1 1.0095 1-01/1-K1 1.0730 M2/01 1.0089
 CENTRAL EPOCH TJJ= 2445923.0

TRANS WORLD PROFILE

SOUTH AMERICA

STATION CAICO

STATION 7311 CAICO RIO GRANDE DO NORTE COMPOSANTE VERTICALE BRESIL
 06 31 33.6S 37 08 16.8W H 19CM P OM D 200KM
 SEISMOLOGIC STATION CAICO, FAZENDA PIATO
 SOCLE PRECAMBRIEN, GNEISS
 UNIVERSIDADE FEDERAL DO RIO GRANDE DO NORTE - DEPARTAMENTO DE FISICA
 TRANS WORLD TIDAL GRAVITY PROFILES P. MELCHIOR
 CENTRO POLITECNICO-GEODESIA-U.F.PR. PROF. C. GEMAEI
 GRAVIMETRE LACOSTE ROMBERG & ASSERVISSEMENT ELECTRONIQUE M. VAN RUYMBEKE
 AJUSTEMENT DE LINEARITE PAR METHODE SATO-HARRISON
 CALIBRATION BRUXELLES - STATION FONDAMENTALE
 INSTALLATION C. POITEVIN, E. RATTON
 MAINTENANCE FRANCISCO A. DOS SANTOS, JOSE MEDEIROS

LEAST SQUARE ANALYSIS / VENEDIKOV FILTERS ON 48 HOURS / PROGRAMMING R. DUCARME
 POTENTIAL CARTWRIGHT-TAYLER-EDDEN / COMPLETE DEVELOPMENT
 COMPUTING CENTER INTERNATIONAL CENTER FOR EARTH TIDES/FAGS/ BRUSSELS
 COMPUTER SPERRY-UNIVAC 1100/81 PROCESSED ON 85/ 3/13

INERTIAL CORRECTION PROPORTIONAL TO THE SQUARE OF ANGULAR SPEEDS

G 8 841212/841230 85 1 3/85 1 5 85 1 9/85 1 9

TIME INTERVAL 29.5 DAYS 624 READINGS 3 BLOKS

WAVE GROUP	ESTIMATED AMPL.	AMPL.	PHASE	RESIDUE
ARGUMENT N WAVE	R.M.S.	FACTOR P.M.S.	DIFF. R.M.S.	AMPL. PHASE
133.-139. 30 Q1	.47 .47	.3517 .3504	-32.724 57.792	1.19 12.4
143.-149. 26 01	7.79 .30	1.1121 .0422	-.795 2.163	.35 18.1
161.-168. 33 P1S1K1	12.29 .22	1.2470 .0228	6.909 1.054	1.78 -123.8
243.-248. 24 N2	17.04 .24	1.2021 .0172	3.366 .803	1.15 60.5
252.-258. 26 M2	90.98 .16	1.2289 .0022	2.960 .103	6.84 43.4
267.-277. 21 S2K2	43.37 .23	1.2593 .0066	2.044 .298	3.72 24.5
335.-375. 16 M3	1.62 .07	1.1254 .0458	-3.341 2.303	.12 -49.4

STANDARD DEVIATION D 4.82 SD 2.40 TD 1.01 MICROGAL
 01/K1 .8918 1-01/1-K1 .4539 M2/01 1.1051
 CENTRAL EPOCH TJJ= 2446061.0

TRANS WORLD PROFILE
STATION 7505 SANTA CRUZ

SOUTH AMERICA
COMPOSANTE VERTICALE

STATION SANTA CRUZ
BOLIVIE

17 46 30 S 63 11 33 W H 410M P 0M D 700KM
SEDIMENTS QUATERNAIRES ALLUVIAUX DU RIO PIRAI, MELANGE SABLE ET ARGILE
CENTRO NACIONAL DE ENFERMEDADES TROPICALES DEL MINISTERIO DE PREVISION SOCIAL
GRAVIMETRE GEODYNAMICS 084 P.MELCHIOR - OBSERVATOIRE ROYAL DE BELGIQUE
UNITE DE CONTROLE RENOVEE - M.VAN RUYMBEKE
CALIBRATION BRUXELLES - FUNDAMENTAL STATION/50.05V/
INSTALLATION M.VAN RUYMBEKE
MAINTENANCE CH.DARRAS

LEAST SQUARE ANALYSIS / VENEDIKOV FILTERS ON 48 HOURS / PROGRAMMING B.DUCARME
POTENTIAL CARTWRIGHT-TAYLER-EDDEN / COMPLETE DEVELOPMENT
COMPUTING CENTER INTERNATIONAL CENTER FOR EARTH TIDES/FAGS/ BRUSSELS
COMPUTER SPERRY-UNIVAC 1100/81 PROCESSED ON 84/10/31

INERTIAL CORRECTION PROPORTIONAL TO THE SQUARE OF ANGULAR SPEEDS
NORMALISATION FACTOR 1.17288
PHASE LAG 01 .692 M2 .913 01/M2 .758
CORRECTION FOR DIFFERENTIAL ATTENUATION M2/01 1.00968 /MODEL 2/

G 84 84 6 5/84 825 84 828/84 913 84 926/84 926

TIME INTERVAL 54.0 DAYS 1008 READINGS 3 BLOKS

WAVE GROUP	ESTIMATED AMPL.	AMPL.	PHASE	RESIDUE
ARGUMENT N WAVE	R.M.S.	FACTOR R.M.S.	DIFF. R.M.S.	AMPL. PHASE
133.-139. 30 Q1	3.97 .13	1.1501 .0368	.577 1.803	.05 -50.8
143.-149. 26 01	20.89 .14	1.1575 .0078	1.103 .381	.40 -84.9
161.-168. 33 P1S1K1	29.58 .15	1.1656 .0061	-1.394 .301	1.00 134.3
243.-248. 24 N2	15.68 .14	1.2042 .0105	1.247 .508	.66 30.9
252.-258. 26 M2	81.01 .15	1.1909 .0022	.857 .106	2.41 30.1
267.-277. 21 S2K2	37.98 .13	1.2000 .0041	1.407 .199	1.56 36.7
335.-375. 16 M3	1.26 .06	.9877 .0495	-2.542 2.928	.12 -151.5

STANDARD DEVIATION D 2.77 SD 2.71 TD 1.20 MICROGAL
01/K1 .9931 1-01/1-K1 .9514 M2/01 1.0288
CENTRAL EPOCH TJJ= 2445943.C

TRANS WORLD PROFILES
STATION 3321 LAMTO

WEST AFRICA
COMPOSANTE VERTICALE

STATION ABIDJAN/LAMTO
COTE D'IVOIRE

6 13 28N 05 01 40W H 101M P 4M D 120KM

GRANITO GNEISS ET GRANITE

OBSERVATOIRE GEOPHYSIQUE DE LAMTO-J.L. TOURNIER.

GRAVIMETRE GEODYNAMICS 765

OBSERVATOIRE ROYAL DE BELGIQUE-P. MELCHIOR

CALIBRATION

BRUXELLES STATION FONDAMENTALE /LWA49.78V/

INSTALLATION

M. VAN RUYMBEKE

MAINTENANCE

J.L. TIREFORD

LEAST SQUARE ANALYSIS / VENEDIKOV FILTERS ON 48 HOURS / PROGRAMMING B. DUCARME
POTENTIAL CARTWRIGHT-TAYLER-EDDEN / COMPLETE DEVELOPMENT
COMPUTING CENTER INTERNATIONAL CENTER FOR EARTH TIDES/FAGS/ BRUSSELS
COMPUTER SPERRY-UNIVAC 1100/81 PROCESSED ON 84/ 9/ 5

INERTIAL CORRECTION PROPORTIONAL TO THE SQUARE OF ANGULAR SPEEDS

NORMALISATION FACTOR 1.20032

PHASE LAG 01 .406 M2 .802 01/M2 .506

CORRECTION FOR DIFFERENTIAL ATTENUATION M2/01 1.00279 /MODEL 2/

5765 84 126/84 2 5 84 2 9/84 219 84 225/84 515 84 519/84 6 4 84 6 8/84 618

TIME INTERVAL 145.5 DAYS

3264 READINGS

5 BLOKS

WAVE GROUP	ESTIMATED AMPL.	AMPL.	PHASE	PESIDUE
ARGUMENT N WAVE	P.M.S.	FACTOR P.M.S.	DIFF. R.M.S.	AMPL. PHASE
133.-139. 30 Q1	1.61 .08	1.2594 .03619	1.935 2.811	.14 23.2
143.-149. 26 01	7.89 .08	1.1797 .0116	-1.688 .564	.27 -60.2
161.-168. 33 P1S1K1	9.85 .08	1.0470 .0085	-2.630 .468	.97 -152.4
243.-248. 24 N2	16.86 .26	1.1880 .0180	4.025 .863	1.24 73.3
252.-258. 26 M2	87.99 .26	1.1872 .0035	1.944 .170	3.57 56.7
267.-277. 21 S2K2	41.15 .23	1.1935 .0065	1.444 .318	1.54 42.3
335.-375. 16 M3	1.56 .02	1.0806 .0135	1.864 .711	.05 70.2

STANDAPD DEVIATION D 3.00 SD 9.19 TD .67 MICROGAL

01/K1 1.1268 1-01/1-K1 3.8261 M2/01 1.0064

CENTRAL EPOCH TJJ= 2445798.0

TRANS WORLD PROFILES
STATION 3400 NIAMEY

WEST AFRICA
COMPOSANTE VERTICALE

STATION NIAMEY
NIGER

13 30 56.6 N 02 06 15.3 E H 200 M P CM D 810KM

SEDIMENTS, FORMATIONS SABLEUSES EN TERRASSES

SERVICE TOPOGRAPHIQUE BP 250 NIAMEY

GRAVIMETRE LA COSTE-ROMBERG 336, ASSERVISSEMENT ELECTRONIQUE M. VAN RUYMBEKE,

AJUSTEMENT DE LINEARITE PAR METHODE SATO-HARRISON

CALIBRATION BRUXELLES STATION FONDAMENTALE

INSTALLATION M. VAN RUYMBEKE

MAINTENANCE J.E. MARCHE, MAMANE WAZIRI, MAMANE HALIDOU

LEAST SQUARE ANALYSIS / VENEDIKOV FILTERS ON 48 HOURS / PROGRAMMING B. DUCARME

POTENTIAL CARTWRIGHT-TAYLER-EDDEN / COMPLETE DEVELOPMENT

COMPUTING CENTER INTERNATIONAL CENTER FOR EARTH TIDES/FAGS/ BRUSSELS

COMPUTER SPERRY-UNIVAC 1100/81 PROCESSED ON 84/ 9/ 4

INERTIAL CORRECTION PROPORTIONAL TO THE SQUARE OF ANGULAR SPEEDS
NORMALISATION FACTOR .99571

G336	84	126/84	128	84	131/84	2 2	84	2 6/84	2 6	84	211/84	223	84	227/84	3 2
G336	84	3 7/84	3 9	84	313/84	313	84	317/84	317	84	321/84	321	84	328/84	4 3
G336	84	411/84	413	84	416/84	5 4	84	5 8/84	5 8	84	511/84	521	84	530/84	530
G336	84	6 3/84	6 5												

TIME INTERVAL 133.C DAYS

2208 READINGS

16 BLOKS

WAVE GROUP ARGUMENT	N WAVE	ESTIMATED AMPL. R.M.S.	AMPL. FACTOR	P.M.S.	PHASE DIFF.	R.M.S.	RESIDUE AMPL. PHASE
133.-139.	30 Q1	2.86 .19	1.0585	.0702	-1.130	3.797	.28 -168.3
143.-149.	26 01	16.37 .19	1.1608	.0137	-1.612	.674	.46 -88.2
161.-168.	33 P1S1K1	21.59 .20	1.0887	.0101	1.394	.535	1.11 151.7
243.-248.	24 N2	15.68 .10	1.1548	.0071	.253	.352	.10 136.4
252.-258.	26 M2	82.14 .10	1.1583	.0014	.809	.071	1.17 96.5
267.-277.	21 S2K2	38.23 .09	1.1589	.0026	.835	.129	.56 94.5
335.-375.	16 M3	1.40 .06	1.0345	.0422	3.216	2.297	.09 120.7

STANDARD DEVIATION D 6.01 SD 2.89 TD 1.65 MICROGAL
01/K1 1.0662 1-01/1-K1 1.8117 M2/01 .9979
CENTRAL EPOCH TJJ= 2445791.0

TRANS WORLD PROFILES
STATION 3399 ARLIT

WEST AFRICA
COMPOSANTE VERTICALE

STATION ARLIT
NIGER

16 50 18 N 7 19 26 E H 418M P OM D 1300KM
AMIDAP - STAFF TECHNIQUE
GRAVIMETRE LA COSTE-ROMBERG 336, ASSERVISSEMENT ELECTRONIQUE M. VAN RUYMBEKE,
AJUSTEMENT DE LINEARITE PAR METHODE SATO-HARRISON
CALIBRATION BRUXELLES STATION FONDAMENTALE
INSTALLATION M. VAN RUYMBEKE
MAINTENANCE TH. DAGUENET, PH. MUYS, J. L. COLDERS

LEAST SQUARE ANALYSIS / VENEDIKOV FILTERS ON 48 HOURS / PROGRAMMING B. DUCARME
POTENTIAL CARTWRIGHT-TAYLER-EDDEN / COMPLETE DEVELOPMENT
COMPUTING CENTER INTERNATIONAL CENTER FOR EARTH TIDES/FAGS/ BRUSSELS
COMPUTER SPERRY-UNIVAC 1100/81 PROCESSED ON 85/ 2/21

INERTIAL COPRECTION PROPORTIONAL TO THE SQUARE OF ANGULAR SPEEDS
NORMALISATION FACTOR .99571

G336 84 616/84 616 84 624/84 7 2 84 720/84 724 84 728/84 8 1 84 8 9/84 817
G336 84 821/84 821 84 825/84 829 84 9 4/84 9 8 84 920/84 930 84 10 6/84 1014
G336 84 1022/84 1030

TIME INTERVAL 138.0 DAYS 1920 READINGS 11 BLOKS

WAVE GROUP ARGUMENT	ESTIMATED AMPL. R.M.S.	AMPL. FACTOR	PHASE DIFF.	RESIDUE AMPL.	PHASE
133.-139. 30 Q1	4.43 .40	1.2212 .1106	3.853	.37	54.3
143.-149. 26 O1	21.14 .41	1.1149 .0217	-2.759	1.34	-130.4
161.-168. 33 P1S1K1	30.61 .43	1.1477 .0160	2.182	1.19	78.0
243.-248. 24 N2	14.60 .16	1.1350 .0124	2.036	.62	122.6
252.-258. 26 M2	77.24 .17	1.1493 .0026	.510	1.00	136.6
267.-277. 21 S2K2	35.94 .15	1.1494 .0049	-.014	.34	-178.6
335.-375. 16 M3	1.59 .12	1.2736 .0955	-2.980	.27	-17.9

STANDARD DEVIATION D 11.94 SD 4.33 TD 3.31 MICROGAL
01/K1 .9714 1-01/1-K1 .7775 M2/01 1.0309
CENTRAL EPOCH TJJ= 2445936.0

TRANS WORLD PROFILES
STATION 3325 OUAGADOUGOU

WEST AFRICA
COMPOSANTE VERTICALE

STATION OUAGADOUGOU
BOURKINA FASSO/HTE VOLTA

12 24 10 N 1 29 40 W H 290 M P OM D 800KM
SOCLE ARCHEEN ANTECAMBRIEN GRANITIQUE RECOUVERT DE 30M D'ALTERITE

CRT0 - DIRECTEUR J.P.OUEDRAOGO

GRAVIMETRE GEODYNAMICS 765

CALIBRATION

INSTALLATION

MAINTENANCE

OBSERVATOIRE ROYAL DE BELGIQUE-P.MELCHIOR

BRUXELLES STATION FONDAMENTALE /LWA49.78V/

M. VAN RUYMBEKE

Y.KOUSOUBE, D.DAMASCO, F.PANTRUA, J.PARNOT

LEAST SQUARE ANALYSIS / VENEDIKOV FILTERS ON 48 HOURS / PROGRAMMING B.DUCARME

POTENTIAL CARTWRIGHT-TAYLER-EDDEN / COMPLETE DEVELOPMENT

COMPUTING CENTER INTERNATIONAL CENTER FOR EARTH TIDES/FAGS/ BRUSSELS

COMPUTER SPERRY-UNIVAC 1100/81 PROCESSED ON 85/ 1/24

INERTIAL CORRECTION PROPORTIONAL TO THE SQUARE OF ANGULAR SPEEDS

NORMALISATION FACTOR 1.20032

PHASE LAG O1 .406 M2 .802 O1/M2 .506

CORRECTION FOR DIFFERENTIAL ATTENUATION M2/O1 1.00279 /MODEL 2/

G765 84 7 7/84 7 7 84 710/84 714 84 720/84 910 84 915/84 929 8410 3/8410 7
G765 841011/841013 841019/841029 8411 2/8411 4 841116/841116 841120/841124

TIME INTERVAL 142.5 DAYS

2688 READINGS

10 BLOKS

WAVE GROUP	ESTIMATED AMPL.	AMPL.	PHASE	RESIDUE
ARGUMENT N WAVE	R.M.S.	FACTOR P.M.S.	DIFF. R.M.S.	AMPL. PHASE
133.-139. 30 Q1	2.68 .45	1.1538 .1786	11.395 8.871	.57 97.1
143.-149. 26 O1	14.71 .47	1.1302 .0363	-2.058 1.829	.66 -126.3
161.-168. 33 P1S1K1	22.48 .49	1.2278 .0268	-3.467 1.261	2.11 -40.2
243.-248. 24 N2	15.77 .19	1.1515 .0137	1.572 .663	.45 106.0
252.-258. 26 M2	81.72 .20	1.1422 .0028	1.253 .140	2.21 126.1
267.-277. 21 S2K2	38.27 .17	1.1497 .0051	1.279 .259	.93 112.7
335.-375. 16 M3	1.33 .05	.9720 .0362	.611 2.133	.13 173.8

STANDARD DEVIATION D 16.11 SD 6.15 TD 1.62 MICROGAL
O1/K1 .9205 1-O1/1-K1 .5714 M2/O1 1.0106
CENTRAL EPOCH TJJ= 2445959.0

NORTH-SOUTH EUROPEAN PROFILE
STATION 3886 KEVO

COMPOSANTE VERTICALE

STATION KEVO
FINLANDE

69 45 22 N 27 07 37 E H 99 M P 1 M D 70KM
KEVO SUBARCTIC RESEARCH STATION
UTSJOKI - SURF.BUILD. OLD CONCRETE PILLAR ON BEDROCK, MIGMATITE 2.71
GEODEETTINEN LAITOS HELSINKI J.KAKKURI
GNEISSE GRANITE
OBSERVATOIRE ROYAL DE BELGIQUE DEPT.1 P.MELCHIOR
GRAVIMETRE LA COSTE-ROMBERG 402, ASSERVISSEMENT ELECTRONIQUE M.VAN RUYMBEKE,
AJUSTEMENT DE LINEARITE PAR METHODE SATO-HARRISON
CALIBRATION LA COSTE - ROMBERG
INSTALLATION F.DUCARME, J.KAARIAINEN
MAINTENANCE P.NURMINEN

LEAST SQUARE ANALYSIS / VENEDIKOV FILTERS ON 48 HOURS / PROGRAMMING B.DUCARME
POTENTIAL CARTWRIGHT-TAYLER-LIEFF. / COMPLETE DEVELOPMENT
COMPUTING CENTER INTERNATIONAL CENTER FOR EARTH TIDES/FAGS/ BRUSSELS
COMPUTER SPERRY-UNIVAC 1100/81 PROCESSED ON 84/10/ 5

INERTIAL CORRECTION PROPORTIONAL TO THE SQUARE OF ANGULAR SPEEDS

G402 84 4 2/84 412 84 420/84 5 6 84 510/84 522 84 526/84 6 5 84 6 9/84 8 2
G402 84 8 2/84 626 84 830/84 9 11

TIME INTERVAL 164.5 DAYS

1504 READINGS

7 BLOKS

WAVE GROUP ARGUMENT	N WAVE	ESTIMATED AMPL. R.M.S.	AMPL. FACTOR	P.M.S.	PHASE DIFF.	R.M.S.	RESIDUE AMPL.	PHASE
133.-136.	20 Q1	4.32 .11	1.1161	.0279	1.195	1.427	.19	151.9
143.-145.	16 O1	23.32 .10	1.1540	.0051	.554	.252	.25	115.6
152.-155.	15 N01	1.86 .08	1.1629	.0513	2.252	2.509	.07	78.6
161.-163.	10 P1	11.09 .12	1.1789	.0126	.874	.609	.29	35.6
164.-168.	23 S1K1	32.67 .11	1.1499	.0038	-.878	.186	.61	-55.4
175.-177.	14 J1	1.73 .10	1.0860	.0634	-3.569	3.334	.16	-138.9
184.-186.	11 001	1.00 .08	1.1516	.0900	-2.610	4.469	.05	-101.0
233.-23X.	20 2N2	.29 .03	1.0489	.0977	4.141	5.318	.04	146.4
243.-248.	24 N2	1.98 .03	1.1493	.0172	7.267	.852	.25	97.8
252.-258.	26 M2	11.10 .03	1.2325	.0033	5.859	.150	1.28	62.3
265.-265.	9 L2	.33 .04	1.3010	.1620	21.399	7.097	.12	83.8
267.-273.	9 S2	5.19 .03	1.2389	.0071	1.537	.329	.36	23.0
274.-277.	12 K2	1.39 .03	1.2157	.0229	3.504	1.073	.10	54.3
335.-375.	16 M3	.08 .01	1.2861	.1625	1.800	7.171	.01	10.5

STANDARD DEVIATION D 4.06 SD 1.06 TD .35 MICROGAL
01/K1 1.0036 1-01/1-K1 1.0275 M2/01 1.0680
CENTRAL EPOCH TJJ= 2445874.0

NORTH-SOUTH EUROPEAN PROFILE
STATION 0886 KEVO

COMPOSANTE VERTICALE

STATION KEVO
FINLANDE

69 45 22 N 27 07 37 E H 99 M P 1 M D 70KM

KEVO SUBARCTIC RESEARCH STATION

UTSJOKI - SURF. BUILD. OLD CONCRETE PILLAR ON BEDROCK, MIGHTITE 2.71

GEODEETTINEN LAITOS HELSINKI J.KAKKUPI

GNEISSOSE GRANITE

CATEDRA DE ASTRONOMIA Y GEODESIA, UNIVERSIDAD COMPLUTENSE MADRID, J.M. TORROJA

GRAVIMETRE LA COSTE-ROMBERG 665, ASSERVISSEMENT ELECTRONIQUE M.VAN RUYMBEKE,

AJUSTMENT DE LINEARITE PAR METHODE SATO-HARRISON

CALIBRATION LA COSTE - ROMBERG

INSTALLATION B.DUCARME, J.KAARIAINEN

MAINTENANCE H.NUPMINEN

LEAST SQUARE ANALYSIS / VENEDIKOV FILTERS ON 48 HOURS / PROGRAMMING B.DUCARME

POTENTIAL CARTWRIGHT-TAYLER-ELDEN / COMPLETE DEVELOPMENT

COMPUTING CENTER INTERNATIONAL CENTER FOR EARTH TIDES/FAGS/ BRUSSELS

COMPUTER SPERRY-UNIVAC 1100/81 PROCESSED ON 85/ 3/20

INERTIAL CORRECTION PROPORTIONAL TO THE SQUARE OF ANGULAR SPEEDS

NORMALISATION FACTOR 1.00729

6665 84 4 4/84 414 84 417/84 720 84 724/84 8 5 84 8 9/84 827 84 831/84 914

TIME INTERVAL 165.5 DAYS 3792 READINGS 5 BLOKS

WAVE GROUP	ESTIMATED AMPL.	AMPL.	PHASE	RESIDUE
ARGUMENT N WAVE	R.M.S.	FACTOR P.M.S.	DIFF. R.M.S.	AMPL. PHASE
133.-136. 20 Q1	4.46 .05	1.1519 .0139	-.196 .688	.03 -152.5
143.-145. 16 Q1	23.37 .05	1.1569 .0026	.174 .126	.09 123.8
152.-155. 15 N01	1.84 .04	1.1576 .0256	1.981 1.266	.06 92.6
161.-163. 10 P1	10.76 .06	1.1447 .0063	-1.367 .312	.27 -108.8
164.-168. 23 S1K1	32.48 .05	1.1432 .0019	-.468 .094	.31 -59.3
175.-177. 14 J1	1.83 .05	1.1491 .0316	1.119 1.577	.04 119.0
184.-186. 11 001	.99 .04	1.1393 .0449	-1.460 2.259	.03 -126.7
233.-238. 20 2N2	.30 .02	1.0800 .0636	-1.721 3.387	.02 -158.1
243.-248. 24 N2	1.97 .02	1.1455 .0112	6.852 .558	.24 99.5
252.-258. 26 M2	11.03 .02	1.2245 .0021	5.711 .099	1.22 64.4
265.-265. 9 L2	.30 .03	1.1957 .1042	15.740 4.983	.08 91.6
267.-273. 9 S2	5.18 .02	1.2361 .0046	2.072 .215	.37 30.7
274.-277. 12 K2	1.42 .02	1.2457 .0148	1.471 .678	.10 20.6
335.-375. 16 M3	.10 .01	1.5867 .2259	-9.076 6.093	.03 -26.6

STANDARD DEVIATION 0 2.16 SD .73 TD .52 MICROGAL
01/K1 1.0120 1-01/1-K1 1.0961 M2/01 1.0584
CENTRAL EPOCH TJJ= 2445876.0

STATION 0402 MADRID

COMPOSANTE VERTICALE

ESPAGNE

40 27 07 N 03 43 28 E H 650 M P 0 M D 320KM
 GRAVIMETRE LA COSTE-ROMBERG 402, ASSERVISSEMENT ELECTRONIQUE M.VAN RUYMBEKE,
 AJUSTEMENT DE LINEARITE PAR METHODE SATO-HARRISON
 CALIBRATION LA COSTE - ROMBERG
 INSTALLATION
 MAINTENANCE

LEAST SQUARE ANALYSIS / VENEDIKOV FILTERS ON 48 HOURS / PROGRAMMING B.DUCARME
 POTENTIAL CARTWRIGHT-TAYLER-EDDEN / COMPLETE DEVELOPMENT
 COMPUTING CENTER INTERNATIONAL CENTER FOR EARTH TIDES/FAGS/ BRUSSELS
 COMPUTER SPERRY-UNIVAC 1100/81 PROCESSED ON 85/ 2/15

INEPTIAL CORRECTION PROPORTIONAL TO THE SQUARE OF ANGULAR SPEEDS

G402 84 930/841030 8411 3/8412 5

TIME INTERVAL 68.0 DAYS 1584 READINGS 2 BLOKS

WAVE GROUP		ESTIMATED AMPL.		AMPL.		PHASE		RESIDUE	
ARGUMENT	N WAVE	R.M.S.	FACTOR	R.M.S.	DIFF.	R.M.S.	AMPL.	PHASE	
133.-139.	30 Q1	6.87	.08	1.1689	.0142	-.829	.697	.11 -61.3	
143.-149.	26 01	35.26	.09	1.1491	.0029	-.376	.142	.39 -143.6	
161.-168.	33 P1S1K1	48.95	.09	1.1345	.0021	.475	.104	.43 108.4	
243.-248.	24 N2	9.20	.08	1.1052	.0097	3.951	.502	.79 127.1	
252.-258.	26 M2	49.81	.08	1.1454	.0019	4.642	.096	4.11 101.2	
267.-277.	21 S2K2	23.91	.07	1.1818	.0034	3.344	.167	1.45 74.1	
335.-375.	16 M3	.67	.03	1.0257	.0521	-3.222	2.904	.05 -126.9	

STANDARD DEVIATION D 2.38 SD 2.03 TD .81 MICROGAL
 01/K1 1.0129 1-01/1-K1 1.1085 M2/01 .9968
 CENTRAL EPOCH TJJ= 2446007.0

STATION 0402 MADRID

COMPOSANTE VERTICALE

ESPAGNE

40 27 07 N 03 43 28 E H 650 M P 0 M D 320KM
 GRAVIMETRE LA COSTE-ROMBERG 427, ASSERVISSEMENT ELECTRONIQUE M.VAN RUYMBEKE,
 AJUSTEMENT DE LINEARITE PAR METHODE SATO-HARRISON
 CALIBRATION LA COSTE - ROMBERG
 INSTALLATION R. VIEIRA
 MAINTENANCE P. VIEIRA

LEAST SQUARE ANALYSIS / VENEDIKOV FILTERS ON 48 HOURS / PROGRAMMING B.DUCARME
 POTENTIAL CARTWRIGHT-TAYLER-LEDEN / COMPLETE DEVELOPMENT
 COMPUTING CENTER INTERNATIONAL CENTER FOR EARTH TIDES/FAGS/ BRUSSELS
 COMPUTER SPERRY-UNIVAC 1100/81 PROCESSED ON 85/ 2/19

INERTIAL CORRECTION PROPORTIONAL TO THE SQUARE OF ANGULAR SPEEDS

G487 841011/841011 841014/841016 841020/841030 8411 5/841119 841123/841125
 G487 841129/8412 3

TIME INTERVAL 55.5 DAYS 1056 READINGS 6 BLOKS

WAVE GROUP	ESTIMATED AMPL.	AMPL.	PHASE	RESIDUE
ARGUMENT M WAVE	F.M.S.	FACTOP P.M.S.	DIFF. R.M.S.	AMPL. PHASE
133.-139. 30 Q1	6.62 .16	1.1270 .0264	-3.090 1.340	.41 -119.4
143.-149. 26 01	35.16 .16	1.1458 .0051	-.360 .253	.47 -151.9
161.-168. 33 P1S1K1	49.14 .15	1.1389 .0035	.019 .177	.06 15.6
243.-248. 24 N2	9.27 .06	1.1138 .0100	4.324 .505	.81 120.5
252.-258. 26 M2	49.75 .08	1.1439 .0019	4.264 .097	3.79 102.8
267.-277. 21 S2K2	23.78 .07	1.1754 .0035	3.268 .175	1.38 78.7
335.-375. 16 M3	.66 .06	1.0216 .0935	-9.217 5.264	.11 -109.8

STANDARD DEVIATION D 3.32 SD 1.58 TD 1.23 MICROGAL
 01/K1 1.0061 1-01/1-K1 1.0498 M2/01 .9983
 CENTRAL EPOCH TJJ= 2446011.0

TRANS EUROPEAN PROFILE

STATION BRUXELLES

STATION 0201 BRUXELLES-UCCLE COMPOSANTE VERTICALE BELGIQUE
 50 47 55 N 04 21 29 E H 101 M P 4M C 90KM 981 117 301
 BASSIN EOCENE DE BRUXELLES SUR LE CAMBRIEN DU MASSIF DU BRABANT.
 SABLES LUTETIENS.
 OBSERVATOIRE ROYAL DE BELGIQUE DEPT.1 P.MELCHIOR
 GRAVIMETRE LA COSTE-ROMBERG 402, ASSERVISSEMENT ELECTRONIQUE M.VAN RUYMBEKE,
 AJUSTEMENT DE LINEARITE PAR METHODE SATO-HARRISON
 CALIBRATION LA COSTE - ROMBERG
 INSTALLATION M. VAN RUYMBEKE
 MAINTENANCE R. LAURENT, J. JEAN

LEAST SQUARE ANALYSIS / VENEDIKOV FILTERS ON 48 HOURS / PROGRAMMING B.DUCARME
 POTENTIAL CARTWRIGHT-TAYLER-EDDEN / COMPLETE DEVELOPMENT
 COMPUTING CENTER INTERNATIONAL CENTER FOR EARTH TIDES/FAGS/ BRUSSELS
 COMPUTER SPERRY-UNIVAC 1100/81 PROCESSED ON 84/ 5/ 7

INERTIAL CORRECTION PROPORTIONAL TO THE SQUARE OF ANGULAR SPEEDS

G402 84 1 3/84 1 9 84 115/84 121 84 125/84 2 6 84 211/84 318

TIME INTERVAL 77.0 DAYS 1632 READINGS 4 BLOKS

WAVE GROUP ARGUMENT N WAVE	ESTIMATED AMPL. P.M.S.	AMPL. FACTOR	P.M.S.	PHASE DIFF.	R.M.S.	RESIDUE AMPL. PHASE
133.-139. 30 Q1	6.85 .09	1.1746	.0163	-1.108	.791	.16 -56.8
143.-149. 26 01	35.32 .11	1.1599	.0036	.185	.179	.12 81.6
161.-168. 33 P1S1K1	49.06 .11	1.1456	.0025	.185	.126	.38 25.0
243.-248. 24 N2	6.75 .05	1.1741	.0086	3.309	.418	.40 80.0
252.-258. 26 M2	35.55 .06	1.1842	.0019	2.732	.093	1.83 66.0
267.-277. 21 S2K2	16.81 .05	1.2036	.0037	1.435	.178	.74 34.9
335.-375. 16 M3	.37 .03	.9946	.0689	-4.975	3.939	.04 -131.6
STANDARD DEVIATION 0	2.85	SD	1.42	TD	.64 MICROGAL	
01/K1 1.0125 1-01/1-K1	1.0983	M2/01	1.0210			
CENTRAL EPOCH TJJ= 2445740.0						

TRANS WORLD PROFILES

BRUSSELS FUNDAMENTAL STATION

STATION 0201 BRUXELLES-UCCLE COMPOSANTE VERTICALE BELGIQUE
 50 47 55 N 04 21 29 E H 101 M P 4M D 90KM 981 117 301
 BASSIN EOCENE DE BRUXELLES SUR LE CAMBRIEN DU MASSIF DU BRABANT.
 SABLES LUTETIENS.
 OBSERVATOIRE ROYAL DE BELGIQUE DEPT.1 P.MELCHIOR
 GRAVIMETRE LA COSTE-ROMBERG 336, ASSERVISSEMENT ELECTRONIQUE M.VAN RUYMBEKE,
 AJUSTEMENT DE LINEARITE PAR METHODE SATO-HARRISON
 CALIBRATION LA COSTE - ROMBERG
 INSTALLATION M. VAN RUYMBEKE
 MAINTENANCE P. LAURENT, J. JEAN

LEAST SQUARE ANALYSIS / VENEDIKOV FILTERS ON 48 HOURS / PROGRAMMING B.DUCARME
 POTENTIAL CARTWRIGHT-TAYLER-EDDEN / COMPLETE DEVELOPMENT
 COMPUTING CENTER INTERNATIONAL CENTER FOR EARTH TIDES/FAGS/ BRUSSELS
 COMPUTER SPERRY-UNIVAC 1100/81 PROCESSED ON 84/ 5/10

INERTIAL CORRECTION PROPORTIONAL TO THE SQUARE OF ANGULAR SPEEDS
 NORMALISATION FACTOR .99571

G336 831020/831028 8311 1/831113 831117/831129 8312 2/8312 8 831212/831220
 G336 831224/831228 84 1 1/84 111

TIME INTERVAL 85.0 DAYS 1776 READINGS 7 BLOKS

WAVE GROUP	ESTIMATED AMPL.	AMPL.	PHASE	RESIDUE
ARGUMENT N WAVE	R.M.S.	FACTOR R.M.S.	DIFF. R.M.S.	AMPL. PHASE
133.-139. 30 Q1	6.65 .10	1.1403 .0167	.275 .837	.12 164.1
143.-149. 26 01	35.36 .08	1.1610 .0028	-.034 .137	.06 -22.0
161.-168. 33 P1S1K1	49.30 .07	1.1510 .0017	.359 .086	.65 28.7
243.-248. 24 N2	6.75 .05	1.1746 .0079	2.414 .384	.29 74.2
252.-258. 26 M2	35.61 .04	1.1928 .0014	2.618 .067	1.89 60.0
267.-277. 21 S2K2	16.89 .04	1.2094 .0030	1.206 .143	.77 27.4
335.-375. 16 M3	.37 .02	.9877 .0564	-3.837 3.250	.04 -141.1

STANDARD DEVIATION D 2.34 SD 1.06 TD .54 MICROGAL
 01/K1 1.0087 1-01/1-K1 1.0662 M2/01 1.0273
 CENTRAL EPOCH TJJ= 2445669.0

TRANS EUROPEAN PROFILE

STATION BRUXELLES

STATION 0201 BRUXELLES-UCCLE COMPOSANTE VERTICALE BELGIQUE
 50 47 55 N 04 21 29 E H 101 M P 4M D 90KM 981 117 301
 BASSIN EOCENE DE BRUXELLES SUR LE CAMBRIEN DU MASSIF DU BRABANT.
 SABLES LUTETIENS.
 OBSERVATOIRE ROYAL DE BELGIQUE DEPT.1 P.MELCHIOR
 INSTITUTO DI ASTRONOMIA Y GEODESIA DEL C.N.R., UNIV.COMPLUTENSE MADRID, R.VIEIRA
 GRAVIMETRE LA COSTE-ROMBERG 434, ASSERVISSEMENT ELECTRONIQUE M.VAN RUYMBEKE,
 AJUSTEMENT DE LINEARITE PAR METHODE SATO-HARRISON
 CALIBRATION LA COSTE - ROMBERG
 INSTALLATION B.DUCARME
 MAINTENANCE R. LAURENT, J. JEAN, ZHOU KUNGEN

LEAST SQUARE ANALYSIS / VENEDIKOV FILTERS ON 48 HOURS / PROGRAMMING B.DUCARME
 POTENTIAL CARTWRIGHT-TAYLER-EDDEN / COMPLETE DEVELOPMENT
 COMPUTING CENTER INTERNATIONAL CENTER FOR EARTH TIDES/FAGS/ BRUSSELS
 COMPUTER SPERRY-UNIVAC 1100/81 PROCESSED ON 85/ 2/25

INERTIAL CORRECTION PROPORTIONAL TO THE SQUARE OF ANGULAR SPEEDS
 NORMALISATION FACTOR 1.02111

G434 6412 5/85 122 85 130/85 2 7 85 211/85 211 85 215/85 215

TIME INTERVAL 74.0 DAYS 1536 READINGS 4 BLOKS

WAVE GROUP ARGUMENT	N WAVE	ESTIMATED AMPL. R.M.S.	AMPL. R.M.S.	PHASE DIFF.	RESIDUE AMPL. PHASE
133.-139.	30 Q1	6.73 .12	1.1546 .0214	-.087	1.063 .03 -160.3
143.-149.	26 01	35.36 .10	1.1610 .0034	-.138	.169 .10 -58.1
161.-168.	33 P1S1K1	49.34 .09	1.1520 .0020	.108	.102 .62 8.6
243.-248.	24 M2	6.70 .06	1.1654 .0112	3.160	.552 .37 86.9
252.-258.	26 M2	35.76 .05	1.1913 .0018	2.427	.086 1.76 59.1
267.-277.	21 S2K2	16.91 .06	1.2109 .0043	1.147	.208 .78 25.6
335.-375.	16 M3	.42 .02	1.1234 .0655	9.515	3.312 .07 77.7

STANDARD DEVIATION D 2.75 SD 1.25 TD .58 MICROGAL
 01/K1 1.0078 1-01/1-K1 1.0593 M2/01 1.0261
 CENTRAL EPOCH TJJ= 2446075.0

TRANS WORLD PROFILES

BRUSSELS FUNDAMENTAL STATION

STATION 0201 BRUXELLES-UCCLE COMPOSANTE VERTICALE BELGIQUE
 50 47 55 N 04 21 29 E H 101 M P 4M D 90KM 981 117 301
 BASSIN EOCENE DE BRUXELLES SUR LE CAMBRIEN DU MASSIF DU BRABANT.
 SABLES LUTETIENS.
 OBSERVATOIRE ROYAL DE BELGIQUE DEPT.1 P.MELCHIOR
 GRAVIMETRE LACOSTE ROMBERG 487, ASSERVISSEMENT ELECTRONIQUE M.VAN RUYMBEKE,
 AJUSTEMENT DE LINEARITE PAR METHODE SATO-HARRISON
 CALIBRATION BRUXELLES - STATION FONDAMENTALE
 INSTALLATION M. VAN RUYMBEKE
 MAINTENANCE M.VAN RUYMBEKE-B.DUCARME-J.JEAN-P.LAURENT

LEAST SQUARE ANALYSIS / VENEDIKOV FILTERS ON 48 HOURS / PROGRAMMING P.DUCARME
 POTENTIAL CARTWRIGHT-TAYLER-EDDEN / COMPLETE DEVELOPMENT
 COMPUTING CENTER INTERNATIONAL CENTER FOR EARTH TIDES/FAGS/ BRUSSELS
 COMPUTER SPERRY-UNIVAC 1100/61 PROCESSED ON 84/ 9/26

INERTIAL CORRECTION PROPORTIONAL TO THE SQUARE OF ANGULAR SPEEDS
 NORMALISATION FACTOR 1.01326

G487 84 331/84 4 2 84 515/84 523 84 527/84 531 84 6 3/84 611 84 619/84 623
 G467 84 622/84 630 84 7 4/84 7 4 84 714/84 714 84 717/84 8 4 84 8 9/84 817
 G487 84 821/84 823

TIME INTERVAL 147.5 DAYS 1872 READINGS 11 BLOKS

WAVE GROUP	ESTIMATED AMPL.	AMPL.	PHASE	RESIDUE
ARGUMENT N WAVE	R.M.S.	FACTOR P.M.S.	DIFF. R.M.S.	AMPL. PHASE
133.-139. 30 Q1	6.55 .14	1.1236 .0232	.408 1.187	.21 167.4
143.-149. 26 O1	35.35 .13	1.1610 .0042	.228 .207	.15 70.2
161.-168. 33 P1S1K1	49.50 .11	1.1557 .0026	.163 .132	.79 10.3
243.-248. 24 N2	6.75 .06	1.1749 .0112	3.857 .548	.46 81.3
252.-258. 26 M2	35.78 .06	1.1920 .0021	2.519 .100	1.82 59.6
267.-277. 21 S2K2	16.95 .07	1.2138 .0048	1.344 .229	.85 28.1
335.-375. 16 M3	.42 .04	1.1164 .0959	-.742 4.881	.02 -16.4

STANDARD DEVIATION D 3.54 SD 1.57 TD .93 MICROGAL
 01/K1 1.0045 1-01/1-K1 1.0336 M2/01 1.0267
 CENTRAL EPOCH TJJ= 2445863.0

TRANS EUROPEAN PROFILE

STATION BRUXELLES

STATION 0201 BRUXELLES-UCCLE COMPOSANTE VERTICALE BELGIQUE
 50 47 55 N 04 21 29 E H 101 M P 4M D 90KM 981 117 301
 BASSIN EOCENE DE BRUXELLES SUR LE CAMBRIEN DU MASSIF DU BRABANT.
 SABLES LUTETIENS.
 OBSERVATOIRE ROYAL DE BELGIQUE DEPT.1 P.MELCHIOR
 INSTITUTO DI ASTRONOMIA Y GEODESIA DEL C.N.R., UNIV.COMPLUTENSE MADRID, R.VIEIRA
 GRAVIMETRE LA COSTE-ROMBERG 665, ASSERVISSEMENT ELECTRONIQUE M.VAN RUYMBEKE,
 AJUSTEMENT DE LINEARITE PAR METHODE SATO-HARRISON
 CALIBRATION LA COSTE - ROMBERG
 INSTALLATION B.DUCARME
 MAINTENANCE R. LAURENT, J. JEAN, ZHOU KUNGEN

LEAST SQUARE ANALYSIS / VENEDIKOV FILTERS ON 48 HOURS / PROGRAMMING B.DUCAPME
 POTENTIAL CARTWRIGHT-TAYLER-EDDEN / COMPLETE DEVELOPMENT
 COMPUTING CENTER INTERNATIONAL CENTER FOR EARTH TIDES/FAGS/ BRUSSELS
 COMPUTER SPERRY-UNIVAC 1100/81 PROCESSED ON 85/ 2/14

INEPTIAL CORRECTION PROPORTIONAL TO THE SQUARE OF ANGULAR SPEEDS

G665 84 929/8410 1 8410 5/8410 7 841011/841017 841021/841023 841027/841029
 G665 8411 2/8411 4 8411 8/841118 841122/841128

TIME INTERVAL 62.0 DAYS 1152 READINGS 8 BLOKS

WAVE GROUP	ESTIMATED AMPL.	AMPL.	PHASE	RESIDUE
ARGUMENT N WAVE	R.M.S.	FACTOR P.M.S.	DIFF. R.M.S.	AMPL. PHASE
133.-139. 30 Q1	6.78 .12	1.1636 .0208	-.810 14009	.10 -76.5
143.-149. 26 O1	35.40 .13	1.1624 .0042	.013 .203	.09 4.7
161.-168. 33 P1S1K1	48.92 .13	1.1422 .0031	.567 .153	.52 68.1
243.-248. 24 N2	6.61 .08	1.1498 .0136	1.988 .683	.24 105.4
252.-258. 26 M2	35.53 .08	1.1835 .0027	2.466 .129	1.67 66.3
267.-277. 21 S2K2	16.80 .07	1.2033 .0048	.980 .226	.67 25.6
335.-375. 16 M3	.36 .03	.9579 .0885	-6.218 5.203	.06 -138.0

STANDARD DEVIATION D 2.73 SD 1.60 TD .66 MICROGAL
 01/K1 1.0177 1-01/1-K1 1.1418 M2/01 1.0182
 CENTRAL EPOCH TJJ= 2446003.0

TRANS EUROPEAN PROFILE

STATION BRUXELLES

STATION 0201 BRUXELLES-UCCLE COMPOSANTE VERTICALE BELGIQUE
 50 47 55 N 04 21 29 E H 101 M P 4M D 90KM 981 117 301
 BASSIN EOCENE DE BRUXELLES SUR LE CAMBRIEN DU MASSIF DU BRABANT.
 SABLES LUTETIENS.
 OBSERVATOIRE ROYAL DE BELGIQUE DEPT.1 P.MELCHIOR
 INSTITUTO DI ASTRONOMIA Y GEODESIA DEL C.N.R., UNIV.COMPLUTENSE MADRID, R.VIEIRA
 GRAVIMETRE LA COSTE-ROMBERG 665, ASSERVISSEMENT ELECTRONIQUE M.VAN RUYMBEKE,
 AJUSTEMENT DE LINEARITE PAR METHODE SATO-HARRISON
 CALIBRATION LA COSTE - ROMBERG
 INSTALLATION B.DUCARME
 MAINTENANCE R. LAURENT, J. JEAN, ZHOU KUNGEN

LEAST SQUARE ANALYSIS / VENEDIKOV FILTERS ON 48 HOURS / PROGRAMMING B.DUCARME
 POTENTIAL CARTWRIGHT-TAYLER-EDDEN / COMPLETE DEVELOPMENT
 COMPUTING CENTER INTERNATIONAL CENTER FOR EARTH TIDES/FAGS/ BRUSSELS
 COMPUTER SPERRY-UNIVAC 1100/61 PROCESSED ON 65/ 2/25

INERTIAL CORRECTION PROPORTIONAL TO THE SQUARE OF ANGULAR SPEEDS
 NORMALISATION FACTOR 1.00729

6665 841130/85 123 85 128/85 128 65 2 1/85 211 85 215/85 215

TIME INTERVAL 78.5 DAYS 1728 READINGS 4 BLOKS

WAVE GROUP	ESTIMATED AMPL.	AMPL.	PHASE	RESIDUE
ARGUMENT N WAVE	R.M.S.	FACTOR R.M.S.	DIFF. R.M.S.	AMPL. PHASE
133.-139. 24 Q1	6.70 .10	1.1495 .0175	-.752 .870	.11 -123.9
143.-149. 26 01	35.36 .08	1.1610 .0027	-.108 .135	.06 -52.4
161.-168. 21 P1S1K1	49.33 .07	1.1518 .0016	.113 .061	.62 9.0
243.-248. 24 N2	6.77 .04	1.1782 .0068	3.469 .336	.42 77.4
252.-258. 26 M2	35.68 .03	1.1887 .0011	2.553 .052	1.79 62.6
267.-277. 21 S2K2	16.87 .04	1.2081 .0027	1.158 .129	.75 27.1
335.-375. 16 M3	.40 .02	1.0646 .0607	-5.879 3.246	.04 -94.4

STANDARD DEVIATION D 2.43 SD .83 TD .57 MICROGAL
 01/K1 1.0079 1-01/1-K1 1.0602 M2/01 1.0239
 CENTRAL EPOCH TJJ= 2446073.0

END

FILMED

12-85

DTIC